The Milbank Memorial Fund

QUARTERLY

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IN THIS ISSUE

THERE is a growing belief that defense needs in this country will serve to crystallize demands for a national population policy, directed in part to the problem of the declining birth rate. Before the War several European countries instituted population policies, and it is obviously of value to learn what we can about those experiences. Detailed descriptions of these experiences are available in scattered sources, mainly in books by D. V. Glass and by Gunnar Myrdal. Dr. G. F. McCleary has performed the valuable service of bringing together in a brief article in this issue a description of the salient features of these programs. Under the title "Pre-War European Population Policies," he discusses in an objective manner the philosophy, provisions, and to some extent the apparent effects of population policies in Belgium, France, Germany, Italy, and Sweden.

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Nutritional status of the population is intimately related to its health and vitality. Accordingly, instruction in dietary and other habits which affect nutrition should take an important place in health education. The article, "The Influence of Nutrition Education in Families of the Mulberry Area of New York City"—by Dorothy L. Bovee, formerly of the Community Service Society of New York, and by Jean Downes of the Fund's staff—presents the results of a study of the effectiveness of dietary education in a group of families where there were children under sixteen years of age. The food habits of the children showed significant improvement in all families in which special educational work was done; the improvement in the use of the protective foods was noteworthy.

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In the hope of securing a better understanding of the factors underlying human fertility, students of population have increasingly emphasized the need for studies of variations in birth rates *within* as well as *between* broad socio-economic groups. One approach to the study of intra-group

differences in human fertility is to base the classifications upon plural rather than single attributes of socio-economic status. This method has been used in the analysis "Intra-Group Differences in Birth Rates of Married Women" by Clyde V. Kiser. It presents cross-classifications of data for native-white married women of child-bearing age in the National Health Survey. These cross-classifications permit analyses of birth rates by educational attainment, and also by income status, ***within occupational groups.*** Conversely, the birth rates are presented by occupational class ***within educational groups*** and also ***within income groups.*** The collective data are discussed from the standpoint of relative importance of factors associated with fertility.

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In the rapid spread of contraceptive services, many of which are now under the auspices of state or local health departments, the policies of the older birth control clinics have been adopted by the newer ones, almost without question. Recent researches by the Fund's staff have revealed the importance of a critical evaluation of these policies.

The first of two articles, dealing with the appraisal of clinics in New York City; Cincinnati, Ohio; and Spartanburg, South Carolina, is published under the title: "Contraceptive Service in Three Areas," Part I, by Regine K. Stix, M.D. It deals with the social and economic backgrounds of the patients of the clinics under consideration and discusses the factors underlying the differences in their fertility before they sought advice at a birth control clinic. A subsequent article, to appear in an early issue of the *Quarterly,* will discuss the services given by the three clinics and the degree to which the services meet the needs of the patients in each area.

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Studies have repeatedly indicated that urban Negro marriages are frequently characterized by lower birth rates and much higher proportions of childlessness than are those of comparable groups of whites. Little actual research has been directed to the explanation of this situation. A modest but interesting contribution in this direction is afforded in an article by Mr. Gilbert W. Beebe: "Differential Fertility by Color for Coal Miners in Logan County, West Virginia." There is rather definite evidence that in the sample studied the lower fertility of Negroes cannot be attributed to contraception.

PRE-WAR EUROPEAN POPULATION POLICIES

G. F. McCLEARY, M.D.

THE population policies considered in this article may be defined as a set of measures introduced or supported by the government of a country for the express purpose of promoting population growth. Before the war such policies were in operation in five European countries: Belgium, France, Germany, Italy, and Sweden; and in several other countries the question of adopting a population policy had become the subject of considerable public discussion. The object of this article is to describe in broad outline the main provisions of the pro-population measures actually in operation in the five countries named before the outbreak of the war. No attempt is made to discuss the influence of the war on any of the measures; adequate material for such a discussion is not available. But it is not unlikely that in some of the countries the measures are no longer in full operation, and that in others various developments contemplated have not been carried into effect. And it is possible that when hostilities have ceased post-war and pre-war conditions may differ so widely that what was done in pre-war Europe to check declining fertility may be of little practical significance. At the present time, however, the European population policies, the circumstances in which they were adopted, and the movement of fertility in the respective countries before and after adoption are of considerable interest to students of population, especially in countries such as the United States, Britain, and Australia, where a period of declining fertility seems likely to be followed at varying but not remote times by a period of declining population.

Policies designed to promote population growth are far from being of recent origin. Laws to encourage marriage and increase fertility were enacted by Augustus Caesar nearly two thousand years ago; and in the Seventeenth and Eighteenth Centuries European statesmen generally regarded population increase as desirable in the

national interest, as a means of augmenting the economic and military power of a nation, and encouraged it by such expedients as the imposition of disabilities upon bachelors and the offer of pecuniary rewards and other special privileges to parents of large families. There is no evidence that these measures had any effect on fertility. According to Tacitus, who, like many other eminent Romans of his time, was a childless man, the legislation of Augustus failed to achieve its object, "so powerful were the attractions of childlessness."[1] Malthus, whose population studies were far more comprehensive than is generally supposed, devoted attention to this aspect of the subject he did so much to make prominent, and concluded that without the influence of religion little could be done by legislation to check declining fertility:

> Positive laws to encourage marriage and population, enacted on the urgency of the occasion, and not mixed with religion, as in China and some other countries, are seldom calculated to answer the end which they aim at, and therefore generally indicate ignorance in the legislator who proposes them; but the apparent necessity of such laws almost invariably indicates a very great degree of moral and political depravity in the state . . . On this account I cannot but agree with Wallace in thinking that Hume was wrong in his supposition that the Roman world was probably the most populous during the long peace under Trajan and the Antonines. We well know that wars do not depopulate much while industry continues in vigor; and that peace will not increase the number of people when they cannot find the means of subsistence. The renewal of the laws relating to marriage under Trajan indicates the continued prevalence of vicious habits and of a languishing industry, and seems inconsistent with the supposition of a great increase of population.[2]

There are, however, modern population scholars who take a more confident view. Professor Reuter writes:

> The downward trend of the birth rate may, of course, be arrested at almost any point desired. A simple removal of financial and other burdens that accompany parenthood in the present situation would be the

[1] Annals, iii, 25.
[2] Essay, Book 1, Ch. xiv.

first step. With the higher standards of modern life it will perhaps also be necessary to insure that the child produced shall have some opportunity for education and development. In the past an appeal to sentiment and a use of various cheap methods have usually been sufficient to insure an adequate supply of workers and soldiers. But these cheap and heretofore effective methods seem likely to prove insufficient when the control of the situation passes into the hands of the people themselves. Children will doubtless always be wanted and they will come in sufficient numbers when society decides to remove the handicap that production engenders.[3]

Professor Fairchild has expressed an equally confident view:

If a restrictive policy were put into effect today, and a hundred years from now it were decided that there had been too much check on population growth, it would be relatively easy to correct the deficiency by some positive policies. But if we permit and encourage a steady growth, and then find that there has been a serious surplus of people, it will be very difficult to bring about a reduction.[4]

The pre-war population policies of France, Belgium, Italy, Germany, and Sweden seem to have been adopted in the confident belief that fertility may be increased by legislation. All aim at checking the decline in the birth rate which, though characteristic generally of Western civilization, has proceeded with varying rapidity in different countries. In France towards the end of the Nineteenth Century it had proceeded so far that the population would have begun to diminish years before had it not been for a large immigration from neighboring countries, chiefly Italy and Spain; and France was the first country to start an organized movement to increase fertility. It began some years after the Franco-Prussian War with the formation of voluntary associations whose chief objects were to bring out the significance of the decline in the French birth rate, to give it a wide publicity, and to agitate for the adoption by the

[3] Reuter, E. B.: Population Problems. Philadelphia, J. B. Lippincott Company, 1923, p. 181.

[4] Fairchild, H. P.: People: The Quantity and Quality of Population. New York, Henry Holt & Company, 1939, p. 292.

legislature of a positive policy to increase fertility. About the end of the Century the movement received the support of a publicist of unique power in Emile Zola, the best-selling writer of his time, who, in 1899, while in exile in England, wrote his famous novel, FÉCONDITÉ, in which he attacked the prevalent voluntary restriction of fertility in France as a symptom that boded ill for the nation.

Side by side with these efforts to increase fertility, there developed a movement to attack the problem of depopulation by reducing infant mortality. The most dynamic pioneer in this advance was Dr. Pierre Budin, and the most effective agency employed was the infant consultation, the first of which was established in 1892 by Budin at the Charité Hospital, Paris.[5] The movement achieved remarkable success. Infant mortality in France fell steadily from 164 per 1,000 births in 1891-1900 to 66 in 1938. But reductions in infant mortality alone can do relatively little to raise the excess of births over deaths. Professor Spengler points out that at the French mortality and natality rates of 1936 a hundred per cent decline in infant mortality would have had no more effect in raising natural increase than would a 7 per cent rise in natality.[6]

The most important element in the French population policy is the family-allowance system, by which wages are automatically increased as the number of dependent children in the wage-earner's family increases. The system attempts to graduate wages in proportion to family expenses, and so equalize the costs of bringing up a family. It is based on the assumption that the causes of the decline in fertility are to a large extent economic. Family allowances were given by a few public-spirited employers as far back as 1854, not, however, to increase fertility but as a measure of social amelioration; it was not until much later that such wage adjustments were adopted for the purpose of checking the decline in the birth rate. Family

[5] McCleary, G. F.: THE EARLY HISTORY OF THE INFANT WELFARE MOVEMENT. London, H. K. Lewis & Co., 1933, pp. 42-45.

[6] Spengler, J. J.: FRANCE FACES DEPOPULATION. Durham, Duke University Press, 1938, p. 250.

allowances became more general during the war of 1914-1918, and were made compulsory in a large number of occupations in 1932.

In France the entire cost of family allowances is borne by the employers, and it amounts on the average to about 3.5 per cent of the total sum expended in wages. The system is administered by local organizations, the Equalization Funds, which assess and collect the contributions payable by each local employer, the contributions forming a local fund from which the allowances are paid to the workers. The contribution of each employer is in proportion to the total number of workers, single and married, he employs; he gains nothing by employing childless men instead of fathers of families. The allowance is paid in cash and usually by postal order sent directly to the mother.

The allowances make but a small addition to wages, although in recent years they have been gradually increased. Mr. D. V. Glass, whose study of the family-allowance system is the most comprehensive yet made, estimates that in 1932 the average allowance increased the basic earnings of an unskilled worker with four dependent children by between 4 and 5 per cent for each child, and that in 1938 the average increase had risen to between 4.7 and 8.2 per cent. In some Departments, however, the allowances shortly before the outbreak of the war were at considerably higher rates. For example, a Parisian worker with basic earnings of 14,000 francs a year would in 1938 have received annual allowances at the rate of 720 francs for the first child, 1,200 for the second, 1,800 for the third, and 2,400 for the fourth and each subsequent child.[7]

[7] Glass, D. V.: POPULATION POLICIES AND MOVEMENTS IN EUROPE. Oxford, The Clarendon Press, 1940, pp. 116-119.

The French family-allowance system was profoundly modified by the *Code de la Famille*, promulgated on July 29, 1939, which requires allowances to be paid to all occupied persons including independent workers and employers. The allowance for the first child was discontinued, a birth premium being paid instead, and the minimum rates were fixed at 10 per cent of the average adult monthly wage in each Department for the second child and 20 per cent for the third and each subsequent child. The total allowance payable in respect of a family of four dependent children would thus amount to 50 per cent of the basic wage. The *Code*, among other measures, set up a marriage loan system for persons engaged in agriculture, revised the income tax in favor of married couples with children,

(Continued on page 110)

In Belgium the payment of family allowances, which began as a voluntary measure, was in 1928 made compulsory for all firms under contract with the Government, and in 1930 for other firms. But, as in France, the sums paid as allowances do not make adequate provision for the additional costs necessarily incurred in rearing the children in respect of whom the allowances are made.

There is no evidence that either in France or Belgium family allowances have done anything to check the decline in the birth rate, which in the period 1926-1930 to 1938 dropped from 18.2 to 14.6 per 1,000 in France and from 18.6 to 15.6 in Belgium. It would, however, be unsafe to conclude from the experience of these two countries that family allowances can do nothing to increase fertility; for in neither country have the allowances been on a sufficient scale to equalize the variations in family expenses due to variations in the size of the family, or substantially to counteract the economic advantages enjoyed by unmarried persons and childless married couples.

Italy's population policy is much more comprehensive. It was inaugurated in 1927 by Signor Mussolini, who laid it down that the fate of nations is bound up with their demographic power, and that Italy to count for something in the world must have a population of at least 60 millions at the beginning of the second half of the century —in 1927 it was about 40 millions. The first step was to impose disabilities upon bachelors, who were subjected to special taxation and to serious disadvantages as candidates for government appointments. Family allowances were introduced, and a variety of measures adopted to promote rural settlement and check urbanization. Special privileges and marks of public approval were bestowed upon the parents of large families. Increased penalties were imposed for illegal abortion, and birth control propaganda and the sale of contraceptive appliances were prohibited. In spite of these and other measures the birth rate fell from 27.7 in 1926 to 23.6 in 1938.

made the teaching of population problems compulsory in schools and increased the penalties for illegal abortion. The effect of the war upon the *Code* is uncertain.
Ibid., pp. 122-123, 214-217.

Germany's population policy was initiated by the National Socialists, who came into power in 1933. In that year the German birth rate, which in 1871-1875 was 38.8 per 1,000, had fallen to 14.7 per 1,000, and the births were 30 per cent below the number required for replacement. The first important measure adopted to increase fertility was a law passed in July, 1933, authorizing the granting of loans to couples who wished to marry but were unable to do so without financial assistance. The loans are given not in cash but in tokens that may be exchanged for furniture and other household requisites. No interest is payable, but the loan must be repaid at the rate of one per cent per month, and one-quarter of the original sum borrowed is canceled at the birth of each child. Up to 1938, the number of loans granted was 1,030,000 and the total sum lent was 650,000,000 marks. The number of births to couples receiving loans was 870,000.

A family-allowance system was introduced in 1936 and greatly extended in 1938. In 1935 provision was made for the payment of lump-sum grants on the birth of a child in a needy family with not fewer than four children. The German population policy includes many other measures designed to increase fertility, such as the imposition of disabilities on bachelors, the according of special privileges to the parents of large families, rural settlements and other expedients to check the tendency of the rural population to migrate to the towns. Illegal abortion is regarded as a serious crime and severely penalized. In addition to such special measures to encourage population increase, the German populace is taught by a variety of publicity agencies that marriage and the procreation of healthy and racially-sound children are duties to be fulfilled in the interests of the whole German race, that the family is an institution to be venerated and kept free from disintegrating influences, and that the voluntary limitation of the family is unworthy of the German people. The German birth rate since 1932 is shown on page 112:[8]

[8] Statistical Year-Book of the League of Nations 1938/39, Geneva, 1939, p. 43.

(Continued on page 112)

Year	*Births per 1,000 Population*	*Year*	*Births per 1,000 Population*
1932	15.1	1936	19.0
1933	14.7	1937	18.8
1934	18.0	1938	19.7
1935	18.9	1939	20.3

According to Dr. Burgdörfer the annual number of births reached replacement level in 1939 for the first time since 1925. He estimates that of the additional number of legitimate births that have occurred since 1933, one-third may fairly be attributed to the increase in the number of marriages and two-thirds to the increase in the fertility of marriages. The statistical data at his disposal enable him to show that there has been an increase not only in first and second births, but in third, fourth, and later births.

To what extent may the increase in German fertility since 1933 be attributed to such special measures as the granting of marriage loans and family allowances—measures that aim at equalizing family economic burdens—or to other factors? This question is discussed by Dr. Burgdörfer, who concludes that these special measures, though important and indeed essential in any effective policy designed to check declining fertility, have played but a minor part in the remarkable increase in marriages and births that has occurred in Germany since the National Socialists came into power. He attributes this increase chiefly to the new world-outlook that the Revolution of 1933 gave to the German people—the new confidence in themselves and in their future, the readiness to renounce ease and personal comfort and shoulder family responsibilities in order to safeguard the future of the race. He concludes, in short, that a policy seeking to check a decline in fertility should rely more on spiritual than on economic factors.[9]

STATISTICAL YEAR-BOOK OF THE LEAGUE OF NATIONS 1939/40, Geneva, 1940, p. 37. *Note:* The above figures relate to boundaries of Germany in 1937, including the Saar Territory.

[9] Burgdörfer, F.: VÖLKER AM ABGRUND. Munich, Lehmann, 1936, 57 pp.; Bevölkerungs-

(Continued on page 113)

The latest country to adopt a population policy is Sweden, where the birth rate began to go down in the last quarter of the Nineteenth Century. The decline was specially marked after 1920, and in 1934 the gross reproduction rate had fallen to 0.815 and the birth rate to 13.7 per 1,000. The decline in the birth rate was not, however, generally regarded as a matter of public importance, the prevailing opinion being that if there were any cause for concern about the population it was the danger of over-population. But at the end of 1934 this attitude was upset by the appearance of a remarkable book, CRISIS IN THE POPULATION QUESTION,[20] by Professor and Mrs. Myrdal, which by the middle of 1937 had sold 16,000 copies, equivalent on a population basis to a sale of some 334,000 copies in the United States. The authors showed that in Sweden the annual number of births had fallen far below the number required for replacement and that the population was heading for a decline. The upheaval in public opinion created by the book led to the appointment in 1935 of a Royal Commission, on whose recommendations a population policy was initiated in 1938.

The Swedish population policy differs in some important respects from the policies adopted in other countries; and to place it in a clearer light it will be useful to consider the demographic position reached by Sweden after a decline in the birth rate that has gone on for some seventy years. Sweden has a population of about 6,300,000 and, according to Professor Myrdal, the net reproduction rate, which for the whole country is somewhat below 0.75, is a little above 1.00 in the agricultural districts, 1.20-1.30 in the sparsely-populated northern provinces, 0.50 in the towns, and somewhat under 0.40 in Stockholm. He states also that, except in Stockholm and some other cities with very low reproduction rates, there is "a strong negative

wissenschaft und Bevölkerungspolitik im neuen Deutschland. *Jahrbuch der Hochschule für Politik*, 1939; Bevölkerungsstatistische und bevölkerungspolitische Rundschau. *Jahreskurse für ärztliche Fortbildung*, Vol. 1, 1940, p. 49.

[20] Myrdal, Alva and Myrdal, Gunnar: CRISIS IN THE POPULATION QUESTION. Stockholm, Albert Bonniers Förlag, 1935, 403 pp.

correlation between income and social status, on the one hand, and number of children, on the other."[11] The agricultural districts, in which the net reproduction rate is unity, contain one-third of Sweden's total population, but the relatively high rate of these districts is more than counterbalanced by the remarkably low rates of the large towns, especially Stockholm. In Professor Myrdal's view, the low reproduction rates in Sweden represent an advanced stage of a dynamic development that may be noted in other countries of the Western World and create a problem that he defines as follows:

> At present the practical problem in western countries is not, as it was a hundred years ago, the inevitable pressure of population against the limits of the available means of subsistence, nor, as it was fifty years ago, how to substitute birth control for vice and misery as checks on population growth. Today the problem is how to get a people to abstain from not reproducing themselves.[12]

In attacking this problem Sweden has adopted a policy that contains no element of repression. It is based on the postulate that parenthood should be voluntary, that there should be no births of unwanted children. The policy therefore places no restrictions on birth control propaganda; on the contrary, it includes measures for spreading information on contraceptive technique particularly by the development of birth control clinics, of which when the policy was initiated there were only five in the whole country, four municipal and one voluntary, with a total attendance in 1935 of not more than about 1,000 patients. Birth control is frankly accepted as a need:

> We do not want to keep up the birth rate by causing the birth of unwanted children, who have to thank ignorance or bad luck for their existence.[13]

Another important feature of the Swedish policy is that it extends the grounds on which abortion may legally be performed. This was

[11] Myrdal, Gunnar: POPULATION: A PROBLEM FOR DEMOCRACY. Cambridge, Harvard University Press, 1940, p. 47.

[12] Myrdal, *ibid.*, p. 20.

[13] Myrdal, Gunnar: Population Problems and Policies. *Annals of the American Academy of Political and Social Science*, May, 1938, pp. 200-215.

effected by an Act passed in May, 1938 which legalized abortion performed for "eugenic and ethical" as well as therapeutic reasons. These measures are in accordance with the opinion expressed by the Swedish Royal Commission on Population, that the homes of the poor should not be burdened by excessive numbers of children.

The policy, being nonrepressive, makes no attempt to discourage the gainful employment of women. Here it differs from the German policy. In Germany the marriage-loans scheme was introduced not only to encourage marriages, but to induce women to give up paid employment and devote themselves to home duties. The loans, therefore, were granted only in cases in which the bride had been gainfully employed for at least nine months in the previous two years, or, if doing housework at home, was to be replaced by a domestic servant. As unemployment among men diminished in Germany, this provision was relaxed, but it never formed part of the Swedish marriage-loans scheme. The Swedish Population Commission recommended that the gainful employment of married women should not be discouraged, but on the contrary should be safeguarded, and in particular that married women should be accorded suitable periods of absence during pregnancy and childbirth without risk of dismissal. This principle has been adopted for women employed by central and local governmental authorities and, in deference to public opinion, by a number of private firms.

It is noteworthy, as emphasizing the nonrepressive character of Sweden's efforts to increase fertility, that no disabilities are imposed upon unmarried persons. Bachelors are not, as in Italy, subjected to special taxation or placed at a disadvantage in applying for government appointments. Such measures are deemed to be incompatible with democratic ideas. It is held that in a democratic country no attempt should be made to goad people into assuming the responsibilities of marriage and parenthood. The central idea underlying the Swedish population policy is that in a democracy any steps taken to encourage population growth should form part of a comprehen-

sive, integrated program of social amelioration, which should aim at reducing mortality and morbidity as well as increasing fertility, and should, therefore, include measures designed to improve the housing and nutrition of the people and generally to promote the public health. It is thought that as the conditions under which the mass of the people live are improved and offer greater security for the future there will be less disinclination to bring children into the world. It is realized, however, that parenthood involves not only increased responsibilities but increased expenses, that with every additional child the economic position of the parents tends to become more unfavorable, and, therefore, that an effective population policy must include measures affording economic support necessary for persons who are prepared to fulfil the function of parenthood.

Prominent among such measures in the Swedish policy is the provision of loans for couples who married not more than six months before the date of application for the loan, or who intend to marry. Under this measure, which came into operation on January 1, 1938, loans up to a maximum of 1,000 kronor may be granted to couples in need of assistance to enable them to obtain necessary household equipment. The loans, which are given in the form of tokens exchangeable for furniture and other household requisites, bear interest at the rate payable for government borrowing, which at the inception of the scheme was 3.25 per cent, and must be repaid in quarterly installments of sufficient amount to refund the whole of the loan within five years. Unlike the German scheme, the Swedish scheme provides no cancellations when children are born. The chief aim of the loans scheme is to set up an economical substitute for the hire-purchase system, provision being made for repayment of the loan during the early years of marriage, when expenses are low.

Another special measure is the payment of a lump sum of 75 kronor on the confinement of a woman whose income, or whose husband's income, does not exceed 3,000 kronor a year. This income limit was adopted in 1937, the previous limit being 500 kronor, and

its effect is to entitle about 92 per cent of all mothers to this maternity grant, which for necessitous mothers may be increased up to a maximum of 300 kronor.

A similar measure is the provision of government grants for orphans, fatherless children, and the children of disabled parents, the grants varying from 300 to 420 kronor a year according to the cost of living in the district in which the child lives. The grants are paid until the children are 16 years of age.

Special provision is made for unmarried mothers and their children. This is a matter of exceptional importance in Sweden, where about 14 per cent of all live births are illegitimate. Legal guardians are appointed to watch over the interests of these mothers and children and to act on their behalf. As in other countries, difficulties are experienced in securing the regular payment of the maintenance allowances adjudged by the courts to be payable by the fathers of illegitimate children. These sums, which vary from 15 to 30 kronor a month, may be advanced by the Government. The national exchequer bears 75 per cent; the local authority, 25 per cent.

In the Swedish population policy, the measures that provide various kinds of awards for the direct encouragement of marriage and fertility are integrated with other measures that aim primarily at alleviating the condition of the poor. Prominent among these is housing reform, the need for which was brought out by the housing censuses taken in 1933 and 1936. Since 1933 large sums have been appropriated by the Legislature for granting loans to contractors undertaking to build new houses or to repair existing houses that have become dilapidated. In 1935 a beginning was made with a project for rehousing families with three or more dependent children living in overcrowded dwellings. For this purpose loans are granted by the central government to the local government authorities for the erection of new dwellings, and it is stipulated that the dwellings must be so designed as to provide such amenities as communal laundries, play centers, day nurseries, and access to open spaces. Special

grants are made to the local authorities on condition that the rents charged are reduced in proportion to the number of dependent children in the family, the reduction varying from 30 per cent for a family of three children to 50 per cent for a family of five or more children. The dwellings built under the rehousing project are let at rents much below those paid generally in the same neighborhood. Whereas in Stockholm an apartment of two rooms, kitchen, and bathroom, with central heating and a constant hot water supply would let at an average rent of 1,124 kronor a year, an apartment built under the project in the same city would be rented at 550 kronor a year for a family with three children and at 400 kronor a year for one with five children.

The provision of free meals for children attending public elementary schools in districts where unemployment is prevalent is another measure which, though primarily aimed at improving public health, is regarded also as tending to encourage population growth by lessening the economic disadvantages falling upon the parents of large families.[14]

The chief characteristics of the Swedish population policy are:

1. It is based on democratic concepts, which are held to be inconsistent with repressive measures such as the special taxation of unmarried persons or the prohibition of birth control propaganda. Measures of this kind form no part of the policy.

2. It assumes that no children unwanted by their parents should be brought into the world, and therefore it seeks to make information on birth control methods widely available and to extend the grounds on which abortion may legally be performed.

3. The special measures designed for the direct encouragement of marriage and fertility, such as the granting of marriage loans, provide assistance not in cash but in kind.

4. Such provisions are associated with measures aimed primarily at promoting public health to form an integrated system of social amelioration.

[14] Glass, D. V.: Population Policies and Movements in Europe. Oxford, The Clarendon Press, 1940, p. 334.

According to Professor Myrdal, Swedes are more interested in the physical, intellectual, and moral quality of the population than in its quantity, and he holds that in Sweden, with its homogeneous population, quality depends not on racial differences but on environment and especially the living conditions of the young generation:

> As so very much is still lacking in the child welfare of our country, we can safely direct all our population policy to the qualitative aim, and rely on the quantitative aim only as a general and broad argument for all such reforms.[35]

The Swedish population policy has not been in operation for a sufficient time to furnish material for an appraisal of its effect on fertility. It is too soon to say whether it is likely to be successful in checking the tendency of the population to decline. The aim of the policy from the quantitative point of view is to raise the net reproduction rate to 1.0 and keep it at that level, and so bring about a stationary population. Professor Myrdal thinks that any further reversal of the present downward trend is unattainable, not only in Sweden but in the Western World generally, "a stationary population constituting the maximum possibility even with the strongest population policy." In his view this maximum will be difficult enough to attain:

> To achieve a fertility rate sufficient to maintain population, the majority of nonsterile marriages must produce four children. Ordinary citizens making up the bulk of every nation—the workers, farmers, clerks, and all the others whose means are small—these ordinary citizens will certainly be privately inclined, from mere prudence and sense of responsibility, not to follow such a population policy unless vast distributional reforms in the interest of families with children are enacted, reforms so radical that public opinion at present is certainly not prepared to accept more than a small fraction of them at most. The ordinary person will be inclined, on the contrary, to restrict the number of his children still more.[36]

Professor Myrdal does not, however, regard the problem as hope-

[35] Myrdal, Gunnar: Population Problems and Policies. *Op. cit.*, pp. 200-215.
[36] Myrdal, Gunnar: POPULATION: A PROBLEM FOR DEMOCRACY. *Op cit.*, p. 57.

less. With a more equal distribution of wealth, it should be possible, he thinks, to convince the ordinary citizen that a family of the size necessary to maintain a stationary population is the kind of family that will give him the maximum satisfaction. There must be "a kind of psychological identification of the individual with the people." Individuals should not be urged to produce children merely as a duty to the State."

The experience of the European countries that have adopted population policies seems to support Malthus's conclusion that such measures "when not mixed with religion, as in China and some other countries, are seldom calculated to answer the end which they aim at." In France and Belgium family allowances appear to have had no effect in raising fertility, though it may reasonably be argued that the allowances have not been on a sufficient scale to influence fertility. In France, however, they were reinforced by considerations of national defense, which, widely publicized as they were, might have been expected to do something to check the trend towards depopulation. In Italy the many-sided policy adopted in 1927 did not prevent the fall in the birth rate from 27.7 per 1,000 in 1926 to 22.4 in 1936. It is true that the birth rate rose to 23.6 in 1938, but a similar increase took place in countries with no population policies, and was probably due to an increase in marriages following partial recovery from economic depression.

In Germany the annual number of births, which in 1933 was 30 per cent below the number required for replacement, steadily rose until in 1939 it reached replacement level. But the circumstances in which this remarkable result was achieved were very exceptional; and it is attributed in Germany not so much to the special pro-population measures as to the new *Weltanschauung* of the German people, which, some would say, has brought into the German population policy that element of "religion" which Malthus regarded as necessary for the success of laws to encourage population growth.

[37] *Ibid.*, pp. 84 and 223.

THE INFLUENCE OF NUTRITION EDUCATION IN FAMILIES OF THE MULBERRY AREA OF NEW YORK CITY[1]

DOROTHY L. BOVEE AND JEAN DOWNES

DURING the period from 1935 to 1938 a community program for the control of tuberculosis was undertaken in the Mulberry area of New York City. The program was a cooperative project shared by the Mulberry Health Center, which was a district health service of The Association for Improving the Condition of the Poor;[2] the Bureau of Tuberculosis of the New York City Department of Health; and the Milbank Memorial Fund. Reports on certain aspects of this special study have been published (1,2,3). This particular report is concerned with a special study of the effectiveness of nutrition education which was carried on as part of the program of health supervision.

Instruction in dietary and other habits which affect nutrition is taking an increasingly important place in health education. Animal research in nutrition has suggested that better growth and greater resistance to infection may result from improved nutrition (4,5,6,7).

Rose has expressed the need for instruction in proper food and health habits as follows: "The development of habits which make for optimum nutrition is wholly a matter of education. There is no instinct for a good diet—apparently quite the contrary." (8) It has also been shown that the principles of an adequate diet may be adapted to various income levels, yet insure a diet that meets essential nutritional requirements for safeguarding health (9).

Adequate nutrition as a factor in the maintenance of good health was considered important for all members of the tuberculous fam-

[1] From the Community Service Society of New York, the Milbank Memorial Fund, and the New York City Department of Health.

[2] The Study was begun when Mulberry Health Center was part of The Association for Improving the Condition of the Poor. This organization merged with the Charity Organization Society in 1939, and both are now known as the Community Service Society of New York.

ilies under supervision in the Mulberry area. Consequently, it was desirable to measure the effectiveness of nutrition education in these families.[3]

This special study was carried out during the period July, 1937, to December, 1939, by the staff nutritionist and the Mulberry Health Center nursing staff under the supervision of Miss Clara R. Price, R.N. The nutrition education work was under the supervision of Miss Lucy H. Gillett, director of the Nutrition Bureau of the Community Service Society of New York.

General nutrition education had been a part of the health program of the Mulberry Health Center for twenty years or more. Through the general program, which included several intensive nutrition education campaigns[4] (10,11) and a program of sustained nutrition teaching by the nurses, it is believed that the food and health habits of these families had been improved previous to the period of the present study. However, the extent of improvement and present status were not known. The special study reported upon in this paper was planned so that the effectiveness of teaching could be measured.

Description of the Mulberry Area

The Mulberry area, known as "Little Italy," is the oldest Italian section in New York City. It is located on the lower East Side of New York, and lies between Canal Street on the south, Houston Street on the north, the Bowery on the east, and Broadway on the west. It is a congested area occupied by families with a relatively low economic status and of Italian origin. Most of the dwellings are of the tenement type with few modern conveniences. Many of the families have lived in the district—often in the same houses—for

[3] The term "nutrition" is used in this study to indicate the quality of the dietary and other factors, such as sunshine, fresh air, sleep and rest, and regularity, which are essential to the proper utilization of food by the body. It is not used to denote the complex bodily processes involved in metabolism.

[4] A school dental-nutrition, education campaign was conducted in seven public schools in the community from 1930 to 1937.

years. They have successfully transferred a large part of their customs, traditions, and the use of many of their familiar foodstuffs from their native land, and have adopted few of the customs of the country to which they have come.

The diet, characteristic of this group of Italians in the Mulberry area, includes large amounts of macaroni and spaghetti and white bread made from refined flour. Very little whole-grain cereal is used except an occasional dried variety. Potatoes and root vegetables are used infrequently, and these low-income families use fewer greens than is generally supposed. The vegetables are often cooked too long, and greens are sometimes precooked in a "first water" which is thrown away because it is thought to be impure. Canned foods are not used because there is an aversion of long standing to them. The popular canned tomato paste is an exception. Milk is used if it is encouraged, and eggs are included daily if income permits. Fish and legumes are used abundantly, and fruits of all varieties are prominent in the diet of nearly every Italian.

Method and Data of Study

As was stated before, the objective of the special project in nutrition education was to find out whether intensive teaching in the home will bring about needed change in habits of eating and of living which are believed to be related to health. The plan of study provided for nutrition education or observation in a total of 135 families. These families were selected from 539 families which were given public health supervision in the special tuberculosis study. There were no cases of adult pulmonary tuberculosis in these families, but in each of them there was one or more children under 17 years of age with demonstrable evidence of primary infection.[5] The family names were arranged alphabetically and every fourth family selected until the total of 135 families was reached. Before any

[5] Demonstrable evidence of primary infection included a positive Mantoux or x-ray evidence of a primary lesion of tuberculosis.

special nutrition education was started, all of the families were visited by the nutritionist and data were secured concerning certain environmental conditions of the family and inquiry was made as to the food and health habits of each child under 17 years of age. These data were recorded on a schedule devised for that special purpose.

After the preliminary survey made by the nutritionist was completed the 135 families were arranged alphabetically and divided into three groups of forty-five families each. One group of forty-five families was assigned to the nutritionist and one group to the nurses for special nutrition teaching. The third group of forty-five families was set aside as a control and in these families no special nutrition work was done. It should be emphasized that neither the nurses nor the nutritionist had anything to do with any part of the selection of the families and did not know in advance which families would be assigned to them.

Intensive nutrition education was carried on in the ninety families by the nutritionist and the nurses for a period of nine months. At the end of that time the 135 families were again visited by the nutritionist and the health and food habits of each child were graded according to the same scale as was used in the preliminary survey.

The schedule used in the survey visits made by the nutritionist included data on certain socio-economic conditions of the family. These were as follows: (1) income and certain expenditures; (2) housing; (3) home management; and (4) attitude of the mother. Data on income and expenditures included the amount of family income from earnings or relief, the average daily amount of money spent for food, and the amount spent for rent. Housing included sleeping arrangements for all members of the family and data concerning ventilation, light, and location of the living quarters. Home management was recorded and graded on the basis of selection and preparation of food, orderliness and cleanliness of the home, the quality of the equipment, and the use of time by the person responsible for the management of the home. The attitude of the

mother toward the household was judged by her indifference to or interest in the general welfare of her children. These data were collected in order to outline more clearly certain problems in each family which might be encountered in the educational program.

For the purpose of grading food habits, information was secured concerning the quality and quantity of food consumed by each child under 17 years of age in the family. The foods which were considered as important for revealing good or poor food habits were: milk, bread and cereals, vegetables, fruits and tomatoes, meat, fish, cheese and legumes, eggs, fats, sugar, tea and coffee, and cod-liver oil. The mother or person responsible for the management of the home was questioned concerning the daily quantity of each of these foods consumed by each child. Information was also sought concerning the kinds of bread and cereals used; that is, white or dark; the kinds of vegetables, whether root or leafy; and the kinds of fruits eaten.

Each child in the family was given a rating on habits of living which are believed to be related to health. The mother was asked about the child's appetite, regularity of meals, the number of hours of sleep, the usual hour of bedtime, time in fresh air and exercise, the daily amount of water or milk used, and habits of elimination.

Each food habit of each child was graded and classified according to the following categories: good, fair, poor, excess, and "none." These categories for each food were carefully defined according to known standards of nutritional adequacy, both as to quality and quantity. "Good," for the food items, corresponded to an optimum adequate requirement, and "fair" covered the minimum adequate requirement. "Poor" included quality and quantity less than the minimum adequate requirement. "Excess" was practically synonymous with "poor," and the category "none" is self-explained. As an example, for vegetables the categories were as follows: "good"—3 or more vegetables daily (2 green vegetables and 1 root vegetable, or 3 green vegetables); "fair"—2 vegetables daily (1 green and 1 root

vegetable, or 2 root vegetables, or 2 green vegetables with potatoes three or four times a week); "poor"—1 vegetable daily with potatoes two or three times weekly (1 root or 1 green vegetable with potatoes as specified); "none"—no vegetables used.

Health habits were classified according to the same categories as those for food habits. The ratings for health habits were defined according to generally accepted standards of good health practices. For example, for water, "good" was defined as 6 to 8 glasses daily; "fair"—4 to 5 glasses daily; "poor"—1 to 3 glasses daily.

A detailed description of the content of the categories "good," "fair," "poor," etc. for each food item and health habit is shown in Appendix I.

Any rating of food and health habits is obviously somewhat arbitrary and subject to inaccuracy. One of the weaknesses is that it is based to a certain extent on personal judgment. In order to offset as much as possible the personal element in judging and to maintain consistency of rating, the nutritionist made all of the survey visits throughout the study.

As was stated above, the record secured on all survey visits was usually taken from the mother in the household. Ample time was allotted for the interview in order to secure as accurate and complete information as possible. The need of sufficient time for the interview was explained to the mother, and if her time was too limited when the first visit was made, a special appointment was arranged with her for the interview. The nutritionist used a technique of questioning which it was hoped would preclude the likelihood of suggesting answers. A rating was entered on the record forms on the basis of the mother's answers. No comments were made by the nutritionist on the quality of the food habits or health practices during the visit.

On each survey visit the nutritionist set up a family budget according to the budget allowance schedules used by The Association for Improving the Condition of the Poor. These schedules included allowances for good shelter, an adequate diet at moderate cost,

clothing, fuel and light, household supplies and extras, and carfare and lunch money for working members of the family.

When the first survey visit was completed, the nutritionist made a summary of each family's situation and needs. The main nutrition problems, revealed through the survey, were listed and a tentative plan for correction of the problems was outlined. This summary was attached to each family record so that it could be used as a guide by the nurses and the nutritionist in planning their educational program for the family. Furthermore, the nutritionist acted as a consultant to the nurses, helping them with any nutrition problems by offering suggestions, providing educational materials, and visiting in the homes with them upon request.

Similarity of the Groups of Families

The method of selection of the 135 families for special study has been described, and the method of allocation of the families to their respective groups for special teaching or control purposes has been explained. If no selective factor or bias has influenced the method of sampling and of allocating the families to the three groups—(1) those to be given special teaching by the nutritionist; (2) those to be given special teaching by the nurses; and (3) those set aside for control purposes—the three groups of families should, at the beginning of the special study, be fairly similar in such respects as the age of the children and number per family, source of family income, and food and health habits of the children. From data secured on the first survey of the families it is possible to examine the similarity of the three groups.

There were 413 children under 17 years of age in the 135 families. The distribution of the children by age is shown in Table 1. It is evident that in this respect the three groups of families were generally similar. The number of children per family was 3.0 in the families given special teaching by the nurses, 3.1 in the control group, and 3.2 children per family in the nutritionist's group.

There were no striking differences among the three groups of

Families Classified According to Source of Education	Total Children	Age Groups			
		0–4	5–9	10–14	15 and 16
	PER CENT				
None-Control	100.0	13.0	30.4	42.8	13.8
Nurses	100.0	15.0	30.8	38.4	15.8
Nutritionist	100.0	17.7	32.4	40.1	14.8
	NUMBER				
None-Control	138	18	42	59	19
Nurses	133	20	41	51	21
Nutritionist	142	18	46	57	21

Table 1. Distribution of the children by age in three groups of families in the Mulberry area of New York City.

families with regard to source of income. In Table 2 the families are classified according to the source of income at the beginning of the study period. For approximately 50 per cent of the total in each group the source of the income was earnings alone.

The data concerning food habits of the children obtained from the mother at the time of the initial survey visit are presented in Table 3. The ratings "good" and "fair" were combined and used as "good," and the ratings "poor," "excess," and "none" were com-

Table 2. Source of income in three groups of families in the Mulberry area of New York City.

Families Classified According to Source of Education	Total	Source of Income			Source of Income Unknown
		Earnings	Earnings and Relief	Relief Only	
	PER CENT				
None-Control	100.0	50.0	25.0	25.0	
Nurses	100.0	47.5	15.0	37.5	
Nutritionist	100.0	58.5	19.5	22.0	
	NUMBER				
None-Control	45	22	11	11	1
Nurses	45	19	6	15	5
Nutritionist	45	24	8	9	4

Food Habits	Per Cent of Children in Each Group with Specified Rating						Number of Children Rated		
	good			poor					
	Control	Nurses	Nutritionist	Control	Nurses	Nutritionist	Control	Nurses	Nutritionist
Milk	72.3	70.7	64.8	27.7	29.3	35.2	137	133	142
Meat, Cheese, Legumes	83.1	88.5	83.6	16.9	11.5	17.0	136	130	141
Eggs	68.4	51.1	70.4	31.6	48.9	29.6	136	131	142
Fruits, Tomatoes	69.6	68.7	75.1	30.4	31.3	24.8	138	131	141
Vegetables	32.4	46.6	42.9	67.6	53.4	57.4	136	131	141
Bread, Cereals	30.9	33.6	27.0	69.1	66.4	73.0	136	131	141
Fats	45.6	38.5	41.8	54.4	61.5	58.2	136	130	141
Sugar	68.4	58.4	65.2	31.6	41.5	34.8	136	130	141
Cod-Liver Oil	10.1	20.6	11.3	89.9	79.4	88.7	138	131	142
Tea and Coffee	22.1	18.5	16.3	77.9	81.5	83.7	136	130	141

Table 3. Rating on food habits of the children in three groups of families at the time of the first survey visit—Mulberry area of New York City.

bined and used as "poor." "Good" includes anything within the range of minimum adequate requirement to optimum requirement, while "poor" includes inadequate or excessive. In general, the children in all three groups had fairly similar food habits as indicated by the proportion in each group with a "good" or "poor" rating for the various foods. For example, the proportion of children who had a rating of "good" for the drinking of milk ranged from 65 per cent in the nutritionist's group of families to 72 per cent in the control families. In the families carried by the nurses the children had a relatively low rating of "good" on the consumption of eggs as part of the diet, and in the control families the children had relatively low ratings on vegetables. However, in no one of the groups of families were the ratings for food habits consistently different from the other groups studied.

Table 4 shows the rating on the various health habits for the children in each group of families. These habits, like the food habits,

Health Habits	Per Cent of Children in Each Group with Specified Rating						Number of Children Rated		
	good			poor					
	Control	Nurses	Nutritionist	Control	Nurses	Nutritionist	Control	Nurses	Nutritionist
Appetite	76.6	87.1	88.0	23.4	12.9	12.0	137	132	142
Regular Meals	89.0	86.4	93.7	11.0	13.6	6.3	137	132	142
Water Drinking	97.8	95.4	93.7	2.2	4.6	6.4	135	131	141
Bedtime	38.0	53.0	38.0	62.0	47.0	62.0	137	132	142
Hours of Sleep	44.9	40.5	43.0	55.1	59.5	57.0	127	121	137
Fresh Air	96.4	99.2	99.3	3.6	0.8	0.7	137	132	142
Exercise	88.9	91.5	77.7	11.1	8.5	22.3	135	130	139
Elimination	79.6	89.3	93.7	20.4	10.7	6.4	137	131	142

Table 4. Rating on health habits of the children in three groups of families at the time of the first survey visit—Mulberry area of New York City.

show a fairly close similarity at the beginning of the study for the three groups of families.

From the data presented, it may be concluded that the three groups of families which constitute the sample for special study and education in nutrition were generally alike in all important respects, such as the number of children per family, source of income, and living and dietary habits of the children.

Before considering the results of the special teaching in these families there are certain indications in Tables 3 and 4 which merit some discussion. The proportion of children with a rating of "good" on food habits (Table 3) reveals that most of those in the total 135 families had a diet which included adequate amounts of the protective foods, namely, milk, eggs, fruits and tomatoes, and vegetables. A high proportion also had adequate amounts of meat, cheese, and legumes. The ratings on bread and cereals were relatively low, due for the most part to the quality of the bread and cereals used; that is, lack of bread and cereals containing the whole-wheat grain.

Table 4 indicates that a high proportion of the children in all

families had an acceptable rating on habits of living. The only exceptions were "bedtime" and "hours of sleep." These habits were generally poor for the children in all families. These are habits determined in part by crowded living quarters and generally poor housing, conditions which were common to the district studied.

Problems, Method, and Content of Nutrition Teaching

Before presentation of the results of nutrition education in the families selected for special study, it is of interest to call attention to some of the problems encountered and to indicate the method and content of the nutrition teaching.

No two families presented the same problems. Incomes, as well as family needs and abilities, varied. The food budget of a family, for example, is subject to variations due to individual differences in age, sex, height, weight, and kind of activity performed. Some member of a household may have special diet needs, such as a diabetic or an allergic person, whose food requires special consideration. On a low income this is an important problem, calling for skillful adjustment of family expenditures. Thus, the cost of food for a family will vary according to its size, make-up, and physical condition.

In some instances the income was too small, or it was adequate but unwisely spent. Food and health habits of the children in some families may be poor, due to neglect because the mother was ill or employed outside of the home, or she may be indifferent to the welfare of the children. Problems of this type require special attention and adjustment suited to the individual family. Other problems include inadequate sleeping facilities, poor kitchen equipment, an oven that won't bake, feeding and behavior problems, and poor management of time, any one or all of which may be factors which contribute to poor nutrition.

Today, most families have access to general nutrition information through radio, magazines, and newspapers. This information may

be helpful in improving nutritional practice in families. However, among foreign groups with traditional habits, personal teaching is necessary. For example, a mother may be quite indifferent to the suggestion that her child needs three or four oranges a week if there is very little money to spend and the full amount of weekly income is already being spent on things which seem to her indispensable. She may be quite convinced that this recommendation cannot be applied to her family. These mothers need individual help with their food and budget problems; they must be shown how to adjust the dietary and substitute important foods for less important ones so as to provide the proper food values for their families. In some instances less money than is being spent may be required to feed the family well-balanced meals.

The families observed in this study showed the particular problems indicated above and many other important ones requiring special attention.

Method and Content of Nutrition Teaching. It is appropriate at this point to describe in some detail the method and content of teaching nutrition in the family which was used by the nutritionist. Regular home visits were made to give instruction as to how the nutrition problems of the family could be solved. Where a large food expenditure yielded a poor return in food value, the mother was shown how she might adjust her expenditures through a budget plan. She was shown how the food-dollar should be proportioned among the various food groups. Where income was low and a large proportion had to be spent for food, an economical food-plan was suggested to suit the level of income for the particular family. Such a food-plan included the amounts and kinds of food which could be bought at current prices in the neighborhood.

Where a mother was unfamiliar with methods of preparing foods which were recommended but strange to her, the nutritionist demonstrated the preparation in the home. Where careless or extravagant buying was a problem, the mother was taken on a trip to the

market and wise selection of food was discussed. If storage space permitted, buying food in quantity was advocated. Such suggestions as the use of day-old bread, tub butter, brown eggs for cooking, were given; and the value of reading labels to compare measures and standards was pointed out as a method of thrift which would help reduce food costs. In some homes instruction in menu planning, child training, and infant feeding was given. Special attention was directed to families where there were undernourished or underweight children and expectant mothers whose food needs are naturally greater. The use of undesirable foods and laxatives was discouraged in all homes, and emphasis was placed on the practice of good food and proper health habits, such as regularity of meals, elimination, ample sleep, fresh air, sunlight, and the use of sufficient water for drinking.

The use of devices by which food values could be represented were helpful with mothers as well as with children. When a mother was unable to speak English, instruction often had to be given through the use of visual material and literature translated into Italian. If these devices were ineffective, some neighbor was usually willing to act as an interpreter. Where the mother failed to cooperate, the father or an older child was urged to carry out the suggestions.

Problems which were outside the scope of nutrition were referred to the nurse or to the supervisor for attention. Where insufficient income was a problem, the family was referred to a relief agency before nutrition education was begun.

The nurses were encouraged to use the same methods of nutrition teaching as those employed by the nutrition worker.

Results of Special Education in Nutrition

As a starting point, a description of the food and health habits of the children in each family was secured, which indicated to the nutritionist and the nurses what nutrition and health teaching were

Food Habits	Per Cent of Children in Each Group with Specified Rating					
	good			poor		
	Control	Nurses	Nutritionist	Control	Nurses	Nutritionist
Milk						
First Survey	72.3	70.7	64.8	27.7	29.3	35.2
Second Survey	73.2	82.0	93.5	26.8	18.0	6.5
Meat-Legumes						
First Survey	83.1	88.5	83.6	16.9	11.5	17.0
Second Survey	87.7	95.5	97.9	12.3	4.5	2.1
Eggs						
First Survey	68.4	51.1	70.4	31.6	48.9	29.6
Second Survey	69.6	70.7	89.2	30.4	29.3	10.8
Fruits-Tomatoes						
First Survey	69.6	68.7	75.1	30.4	31.3	24.8
Second Survey	81.9	87.2	92.8	18.1	12.8	7.2
Vegetables						
First Survey	32.4	46.6	42.9	67.6	53.4	57.4
Second Survey	34.8	75.2	87.8	65.2	24.8	12.2
Bread-Cereals						
First Survey	30.9	33.6	27.0	69.1	66.4	73.0
Second Survey	34.1	48.1	65.5	65.9	51.9	34.5
Fats						
First Survey	45.6	38.5	41.8	54.4	61.5	58.2
Second Survey	54.4	45.9	66.2	45.6	54.1	33.8
Sugar						
First Survey	68.4	58.5	65.2	31.6	41.5	34.8
Second Survey	76.8	80.5	92.8	23.2	19.5	7.2
Cod-Liver Oil						
First Survey	10.1	20.6	11.3	89.9	79.4	88.7
Second Survey	8.0	18.9	19.4	92.0	81.1	80.6
Tea and Coffee						
First Survey	22.1	18.5	16.3	77.9	81.5	83.7
Second Survey	23.2	19.5	33.1	76.8	80.5	66.9

Table 5. Comparison of first ratings on food habits of the children in three groups of families with ratings on the same children after an interval of nine months, Mulberry area of New York City.

most needed. This also provided a status as to eating and health habits for each child which could be compared with the child's status after nine months of teaching.

Table 5 shows the proportion of children with a "good" or with a "poor" rating on the second survey visit compared with the ratings on the survey which preceded the period of special nutrition education. It is clearly evident from Table 5 that improvement was shown for the nutritionist's group in all the food items studied, and for the nurses' group the proportion of children with "good" ratings increased for all but two of the food items, namely, cod-liver oil, and tea and coffee. It is apparent also that emphasis was placed on the need for the "protective foods"—milk, fruits, vegetables, and eggs[6] and on a reasonable consumption of sugar. Relatively large gains were shown in each of these food items in the families given special instruction by the nutritionist and the nurses. In a number of instances the food habits of the control group showed some improvement compared with the status at the beginning of the study.

The relatively low level of good ratings shown by the first survey visit for the use of cod-liver oil in all three of the study groups was maintained on the second survey visit. An intensive rickets campaign was carried on for several years in the Mulberry area, when the Health Center was first established, in an attempt to reduce the incidence of rickets among infants (11). The data from the present study indicate that the use of cod-liver oil the year round as a preventive measure is not being generally employed after the period of infancy. If the food budget was limited, cod-liver oil as a part of the diet was not considered important enough to buy regularly.

Frequent emphasis upon the elimination of coffee from the diet may have been responsible for the gain of from 16 per cent to 33 per cent in good ratings for the use of coffee and tea in the nutritionist's group. The use of both coffee and tea for children was discour-

[6] The Sherman classification for protective foods has been used for the purpose of this study.

aged as an unnecessary, as well as an undesirable, habit. In most cases the actual amount of coffee consumed was quite small, as it was largely used to flavor milk. However, for the purposes of this study a "poor" rating was applied to this habit if any amount of coffee was consumed daily.

Table 6. Comparison of first ratings on health habits of the children in three groups of families with ratings on the same children after an interval of nine months, Mulberry area of New York City.

Health Habits	Per Cent of Children in Each Group with Specified Rating					
	good			poor		
	Control	Nurses	Nutri-tionist	Control	Nurses	Nutri-tionist
Appetite						
First Survey	76.6	87.1	88.0	23.4	12.9	12.0
Second Survey	85.5	95.5	92.8	14.5	4.5	7.2
Regular Meals						
First Survey	89.0	86.4	93.7	11.0	13.6	6.3
Second Survey	92.0	92.5	97.8	8.0	7.5	2.2
Water Drinking						
First Survey	97.8	95.4	93.7	2.2	4.6	6.4
Second Survey	94.2	97.7	99.2	5.8	2.3	0.8
Bedtime						
First Survey	38.0	53.0	38.0	62.0	47.0	62.0
Second Survey	30.4	50.4	64.0	69.6	49.6	36.0
Hours of Sleep						
First Survey	44.9	40.5	43.0	55.1	59.5	57.0
Second Survey	51.1	50.4	69.6	48.9	49.2	30.4
Fresh Air						
First Survey	96.4	99.2	99.3	3.6	0.8	0.7
Second Survey	97.8	99.2	100.0	2.2	0.8	.0
Exercise						
First Survey	88.9	91.5	77.7	11.1	8.5	22.3
Second Survey	91.2	94.6	83.3	8.8	5.4	16.7
Elimination						
First Survey	79.6	89.3	93.7	20.4	10.7	6.4
Second Survey	89.1	94.7	98.6	10.9	5.3	1.4

Table 6 shows that for most of the health habits the generally high level of "good" ratings noted on the first survey visit was maintained on the second visit for all three groups of children. Bedtime hours and habits of sleep were the exceptions in the group of health practices studied. The only important increase in the proportion of children rated "good" on these habits was shown for the nutritionist's group.

The chances that the change in ratings of habits of eating noted after the period of special nutrition education might occur as a result of chance variation may be tested statistically. For this purpose it is preferable to present the average picture of food habits of all children for each of the three groups of families. These data are summarized in Table 7. All food habits are included except the use of cod-liver oil and of tea and coffee. The ratings for the eight remaining food habits for each child in each study group have been totaled and constitute the population. The proportions that were "good" are indicated for both survey visits. On the first visit all three groups show a marked similarity in the proportion of ratings in the category "good." On the second survey visit the proportion of the total ratings which were in the class "good" is considerably higher in the nurses' and nutritionist's groups than was noted on the first visit.

Table 7. Differences in ratings of "good" on eight food habits among children in three groups of families after an interval of nine months.

Families Classified According to Source of Education	Per Cent of Ratings "Good"		Differences and Their Standard Errors	Number of "Good" Ratings		Total Ratings on Eight Food Habits[1]	
	First Visit	After Nine Months		First Visit	After Nine Months	First Visit	After Nine Months
None-Control	58.8	64.1	5.3 ± 2.1	642	706	1,091	1,102
Nurses	57.0	73.1	16.1 ± 2.1	597	777	1,047	1,063
Nutritionist	58.8	85.2	26.4 ± 1.9	664	953	1,130	1,118

[1] The food habits are: (1) milk; (2) meat, cheese, and legumes; (3) eggs; (4) fruits and tomatoes; (5) vegetables; (6) bread and cereals; (7) fats, and (8) sugar.

The difference between these per cents or rates after the period of teaching is shown with their standard errors in Column 3 of the table. The difference of 16.1 in the ratings of "good" for the nurses' group is more than seven times its standard error ± 2.1; that is, the probabilities of a deviation of this magnitude arising from chance would be much less than one in a million. In the nutritionist's group the difference in "good" ratings is even greater. On the other hand, the difference of 5.3 shown for the children in the control group of families is only slightly more than twice its standard error, which may be interpreted as of borderline significance.

The use of the four protective foods in the diet showed the same general measure of improvement. This is evident from the average results presented in Table 8.

The conclusion may be drawn that the improvement in eating habits in families given special instruction was statistically significant; that is, it was not due to a chance variation. These results must not be interpreted too broadly; they do not indicate improvement of nutritional status of the children. No objective measure of the individual state of nutrition was included in this special study. The results do signify a measure of success in teaching. However, it has been necessary to accept the reliability of the information given by the mothers to the nutritionist on her second survey. No objective

Table 8. Differences in ratings of "good" on the use of four "protective foods" among children in three groups of families after an interval of nine months.

Families Classified According to Source of Education	Per Cent of Ratings "Good"		Differences and Their Standard Errors	Number of "Good" Ratings		Total Ratings 4 "Protective Foods" Habits[1]	
	First Visit	After Nine Months		First Visit	After Nine Months	First Visit	After Nine Months
None-Control	60.7	64.9	4.2 ± 2.9	332	358	547	552
Nurses	59.3	78.8	19.5 ± 2.8	312	419	526	532
Nutritionist	63.3	90.8	27.5 ± 2.5	358	505	566	556

[1] The protective foods are: (1) milk, (2) eggs, (3) fruits and tomatoes, and (4) vegetables.

observations of the children's actual performance were possible, and it is likely that some of the improvement represents an increase in the mother's ability to give the right answers as much as a change in habits. This is a recognized difficulty in the appraisal of the results of educational efforts, but perhaps it is not being too optimistic to think that where a knowledge of proper dietary practices has been acquired, it will have some influence on action.

The children in the nutritionist's group showed greater improvement than did the children in the nurses' group of families. The difference in the results for the two groups may be significant. However, it is difficult to ascribe this result entirely to more successful teaching by the nutritionist. It is impossible to correct for two factors which may have had considerable effect upon the results obtained by the nutritionist. The nutritionist made all of the survey visits. Since she had given intensive teaching in her own group of families, she may have received a higher proportion of proper responses to the survey questions relative to diet from her families than would have been given to a person who had not done the teaching. Also, all of the nutritionist's visiting time was devoted to nutrition education. On the other hand, the nurses included nutrition education in a program of general health teaching and each nurse had under her supervision approximately one hundred families in addition to those given special nutrition teaching.

In 1928 Gillett and Rice made a study of the influence of education on the dietaries of a group of low-income families in New York City which was compared with a similar study made in 1914 (12). Though the method of the present study is not directly comparable with those of the earlier studies, the general results of education were somewhat similar. Changes in the food habits of the groups of "influenced" and "noninfluenced" families were evaluated on the basis of cost and quantity of foods consumed. The findings indicated that families in which dietary education had been given distributed their money among the various types of food in such a way

as to obtain diets of a higher food value at less cost than did the "uninfluenced" families.

Summary

A special nutrition education program was carried on in ninety families for a period of nine months by the staff nutritionist and the nurses of the Mulberry Health Center. An additional forty-five families in which no special nutrition teaching was done were observed during the same period of time. The purpose of the project was to find out whether intensive nutrition instruction in the home will bring about needed change in habits of eating and living which are believed to be related to health. The children in all of the 135 families were rated on food and health habits at the beginning of the study, and again after an interval of nine months.

Food habits of the children showed significant improvement in all families in which special educational work was done. There was a marked increase in the use of the protective foods, milk, eggs, fruits and tomatoes, and vegetables. The habits of the children in the control families showed relatively little change.

Habits of living which are believed to be related to nutrition were noted for each child in the 135 families. A relatively high proportion of all children had acceptable health habits. Hours of sleep and bedtime were the only habits upon which the majority of children in all families were rated "poor." These are habits determined to a considerable extent by crowded living conditions, and no unusual improvement in them was noted among the children in any group of families.

It is believed that the relatively high proportion of children in this sample of 135 families, which had acceptable ratings on habits of eating and living before this special study of nutrition education was started, offers some evidence of the effectiveness of the general health program which had been conducted in the Mulberry area over a period of about twenty years.

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APPENDIX I

Scale Used for Grading Food Habits

Milk	Good—3-4 glasses a day.
	Fair —2 glasses a day.
	Poor —1 glass a day.
	None—No milk.

Meat, Fish, Cheese, and Legumes	Good—1 or more servings daily, including meat or fish (meat not more than once daily). Fair —(a) 1 serving of cheese or legumes daily (no meat or fish)—provided eggs and milk are adequate or, (b) meat two or three times a week with occasional legumes and cheese—provided milk and eggs are adequate. Poor —1 serving of cheese or legumes daily (no meat or fish) and milk and eggs inadequate. None—No meat, fish, cheese, or legumes. Excess—Meat and others more than once daily.
Eggs	Good—5-7 weekly. Fair —3-5 weekly. Poor —1-3 weekly. Excess—More than 7 weekly. None—No eggs.
Fruit and Tomatoes	Good—1 generous serving or 2 or more smaller servings daily, such as: 1 generous fresh fruit daily with tomato or orange *at least* 3 times a week. Fair —1 small serving daily, such as: 1 serving uncooked fresh fruit with tomato or orange 3 times a week, or 1 serving cooked dried or cooked fresh fruit with tomato or orange 3 times a week. Poor —1 serving of dried fruit daily, or fresh fruit 2 or 3 times weekly, such as: cooked dried fruit only, daily (no citrus or tomato), or fresh fruit only, 2 or 3 times weekly. None—No fruit used.
Vegetables	Good—3 or more vegetables daily, such as: 2 green vegetables and 1 root vegetable daily, or 3 green vegetables daily. Fair —2 vegetables daily, such as: 1 green and 1 root vegetable or 2 root vegetables, or 2 green

vegetables daily and potatoes 3 or 4 times weekly.

Poor —1 vegetable daily with potatoes 2 or 3 times weekly, such as: 1 root vegetable daily, potatoes 2 or 3 times weekly, or 1 green vegetable daily, and potatoes 2 or 3 times weekly.

None—No vegetables used.

Bread

Good—Bread and/or cereal or spaghetti at each meal with dark bread or cereal more than once a day.

Fair —Bread and/or cereal or spaghetti at each meal with dark bread or cereal once a day.

Poor —Insufficient bread and/or cereal or spaghetti at each meal, but no dark bread or cereal *(all white)*.

Excess—Too much bread and/or cereal used.

None—No bread, cereal, or spaghetti used.

Fat

Good—Some fat at each meal (see Fat Schedule for Age).

Fair —Some fat at 2 meals (see Fat Schedule for Age).

Poor —Fat at one meal only (see Fat Schedule for Age).

Excess—All olive oil used, or excess of any fat (see Fat Schedule for Age).

Sugar

Up to 5 Years of Age

Good—2 oz. or less weekly.

Fair —3 oz. weekly.

Poor —4 oz. weekly.

Excess—More than 4 oz. weekly.

5-10 Years of Age

Good—5 oz. or less weekly.

Fair —6 or 7 oz. weekly.

Poor —8 oz. weekly.

Excess—More than 8 oz. weekly.

Over 11 Years of Age
Good—12 oz. or less weekly.
Fair —13-14 oz. weekly.
Poor —15-16 oz. weekly.
Excess—More than 16 oz. weekly.

Cod-Liver Oil
Good—One or more teaspoons daily, or its equivalent in other fish oils.
Fair —Same—3 or 4 times a week.
Poor —Occasionally given.
None—No cod-liver oil or its equivalent in other fish oils.

Coffee and Tea
Good—No tea or coffee.
Fair —Occasional tea or coffee.
Poor —Frequent tea or coffee.
Excess—Daily tea or coffee.

SCALE USED FOR GRADING HEALTH HABITS

Appetite
Good—Hungry at three meals.
Fair —Hungry at two meals.
Poor —Hungry at one meal—fussy appetite at all meals.
None—No appetite at any meal.

Meals (Regularity)
Good—Three meals at same hour daily—well-balanced meals.
Fair —Two meals at same hour daily—third irregular—well-balanced meals.
Poor —One meal at same hour daily—others irregularly.
None—No regular time for meals.

Water (Including Milk)
Good—6-8 glasses daily.
Fair —4-5 glasses daily.
Poor —1-3 glasses daily.
None—No water and/or milk.

Bedtime	Good—In bed at accepted bedtime hour for age every night, with one late night a week. Fair —In bed at accepted bedtime hour every night, except two or three nights a week. Poor —In bed later than accepted bedtime hour more than three nights a week, or stays up more than one hour later than accepted bedtime hour every night during the week. See Bedtime Schedule, Appendix II.
Hours of Sleep	Record actual number of hours.
Fresh Air	*Day* / *Night* Good—Out-of-doors or in well-ventilated room at least 2 hours daily. / Windows open. Fair —Same—5 or 6 days per week. / Windows opened occasionally. Poor —Same—4 or less days per week. / Windows not opened.
Exercise	Good—Plays out-of-doors or in well-ventilated room 2 hours or more a day. Fair —Plays out-of-doors or in well-ventilated room 1 hour at least, daily. Poor —Seldom plays out-of-doors. Usually plays indoors in poorly-ventilated room, or works every day in home after school (if school child). None—No exercise in the form of play. Excess—Plays too long and/or too hard and tires out.
Elimination	Good—Normal, natural bowel movement daily without laxative. Fair —Normal movement five or six days out of seven, with occasional laxative. Poor —Normal movement less than five days per week and use of frequent laxatives.

APPENDIX II

Schedule for Fat—Used as a Guide *(Approximate Values)*

1-2 Years

Good—2 tablespoons weekly with some butter.
Fair —3-4 tablespoons weekly with some butter.
Poor —5-6 tablespoons weekly with some butter or all olive oil.
Excess—More than 6 tablespoons of any fat.

3-8 Years

Good—6-12 tablespoons weekly with some butter.
Fair —13-16 tablespoons weekly with some butter.
Poor —16-20 tablespoons weekly with some butter or all olive oil and no butter.
Excess—More than 20 tablespoons of any fat.

9-17 Years

Good—21-28 tablespoons weekly with some butter.
Fair —29-32 tablespoons weekly with some butter.
Poor —33-36 tablespoons weekly with some butter or all olive oil and no butter.
Excess—More than 36 tablespoons of any fat.

Bedtime Schedule[1]

Age	*Hours Sleep*	*Approximate Bedtime Hour*
2 - 3 years	12½	6:30
4 - 5 "	12	7:00
6 - 7 "	11½	7:00 - 7:30
8 - 9 "	11	8:00
10 - 11 "	10½	8:00
12 - 13 "	10	8:00 - 8:30
All through growing period	9	9:00

[1] Adapted from Roberts, Lydia: Nutrition Work with Children. Revised Edition, 1935. Chicago University Press, p. 181.

INTRA-GROUP DIFFERENCES IN BIRTH RATES OF MARRIED WOMEN[1]

CLYDE V. KISER[2]

DURING the past few years students of population have increasingly stressed the need for studies that go beyond the conventional descriptions of inter-class variations in fertility. For one thing, there is a distinct need for data concerning the proportionate importance of the socio-economic classes characterized by given rates of fertility. Even more important, perhaps, has been the increasing recognition that factors underlying human fertility are too complex ever to be adequately understood simply by comparisons of average birth rates between broad social classes. As a result, particular emphasis has been placed on the desirability of knowledge concerning the character of variations in fertility *within,* as well as *between,* broad socio-economic groups. A thorough approach to the problem would involve sociological and psychological studies of families, and some beginning along this line has been made. The very nature of such surveys, however, limits the number of cases that can be secured. In the meantime, a simpler but important approach is afforded by the large mass of material collected by the National Health Survey. The type of data collected and the large number of cases involved permitted the present intra-group analyses through the mechanism of cross-classifications of data.

Since the characteristics of the National Health Survey have been fully discussed in a previous publication,[3] only a brief description will be given here. The *Survey* was conducted during the fall and winter of 1935-1936 under the auspices of the United States Public

[1] A progress report based upon data collected by the National Health Survey, conducted by the United States Public Health Service with assistance from the Works Progress Administration. The author wishes to express his gratitude to the United States Public Health Service for its cooperation in making these data available.

[2] From the Milbank Memorial Fund.

[3] Perrott, G. St.J.; Tibbitts, C.; and Britten, R. H.: The National Health Survey: Scope and Method of the Nation-wide Canvass of Sickness in Relation to its Social and Economic Setting. *Public Health Reports,* September 15, 1939, liv, No. 37, pp. 1663-1687.

Health Service, with assistance from the Works Progress Administration. Its main purpose was to collect data concerning the incidence and severity of illness among various elements of our urban population, and toward that end detailed records were secured from about 700,000 families residing in eighty-three cities of eighteen states.

The sampling procedure was designed to yield broad regional representativeness of the urban populations, but for reasons of administrative expediency the *Survey* was not planned to be strictly representative by size of city. An unduly high proportion of the records was secured from cities of 100,000 population and over. Within each city selected, however, an attempt was made to secure a cross-section of the population. In fact, in all except one of the fifty-two surveyed cities under 100,000 population, attempts at complete enumeration were made, and in the larger cities the sampling procedures were designed to be random.

The fertility data related to the number of births during the year preceding enumeration. The major tabulations provided for analyses of birth rates among married women of childbearing age, subdivided along demographic and socio-economic lines. A preliminary report based upon these data has been published, showing inter-class variations in marital fertility: first, according to occupational class of the head; next, by educational attainment of the wife; and finally, by amount of family income during the year preceding enumeration.[4] With the collaboration of Dr. Karpinos of the United States Public Health Service, who secured some additional tabulations embracing all surveyed urban white women 15-44 years of age regardless of marital status, an analysis has also been published in which class differences in marital fertility are compared with those in general fertility and net reproduction.[5]

[4] Kiser, C. V.: Birth Rates and Socio-Economic Attributes in 1935. The Milbank Memorial Fund *Quarterly*, April, 1939, xvii, No. 2, pp. 128-151.

[5] Karpinos, B. D. and Kiser, C. V.: The Differential Fertility and Potential Rates of

(Continued on page 149)

Two central points of interest have been described in the published preliminary analyses. In the first place was the strongly suggestive indication that class differences in the fertility of urban native-white *married* women in this country are becoming less important.[6] The trend cannot be described in a definitive manner since the *Survey* data are not sufficiently comparable with those for earlier studies in this country. An interesting aspect of this trend, however, was the emergence of an exception to the traditional inverse order of the classes with respect to marital fertility. This was the failure of married women in the topmost classes to be characterized consistently by lowest birth rates. The average rate for native-white urban wives of professional men was a little higher than that for wives of business men. On the basis of family income the decline of birth rates with increasing income did not extend into the upper levels. On the basis of educational status the birth rate of wives reporting college attendance was almost as high as that for wives reporting that their formal schooling was limited to entrance into high school.

The second point of interest, however, was that there is still a strong inverse association between socio-economic status and net rates of reproduction. This was brought out by the analysis of births in relation to all surveyed urban white females of childbearing age.[7] The net rate of reproduction, of course, is based on the fertility and mortality experience of all females regardless of marital status. Thus, although married women of topmost socio-economic status may not be characterized by lowest birth rates, the general birth rates and reproduction rates for the topmost classes do stand in lowest positions. This latter situation arises from the fact that marriages are less frequent in the upper than in the lower classes, especially when younger ages of the childbearing span are considered.

Thus, care must be taken in the interpretation of the newer trends

Growth of Various Income and Educational Classes of Urban Populations in the United States. The Milbank Memorial Fund *Quarterly*, October, 1939, xvii, No. 4, pp. 367-391.

[6] *See* footnote 4 above.

[7] *See* footnote 5 above.

in the differential fertility of married women. They do not signify changes in the traditional inverse order of the classes with respect to net rates of reproduction. Changes in the class-pattern of *marital* fertility, however, are real. They have been substantiated by other data for this country, notably by Notestein's study of 1930 family Census data for the East North Central states.[8] Innes[9] has recently found that the same type of changes in class fertility has taken place in England and Wales and, through comparisons of birth rates for specific classes in 1921 and 1931, has provided some badly needed measurements of such trends.

The present paper is devoted to some further analyses of class variations in the fertility of married women of childbearing age enumerated in the Health Survey. We may take as a point of departure the birth rates standardized for age for certain socio-economic classes and proceed to consider three matters: (1) the birth rates in relation to the proportionate importance of the various classes considered; (2) the character of variations in fertility *within* classes, as afforded by the cross-classifications of the data; and (3) the implications regarding relative importance of specific factors on variations in human fertility.

Differential Fertility in Relation to Proportionate Importance of Classes

We may first consider briefly the class differences in marital fertility in relation to proportionate importance of the classes. In Figure 1 birth rates standardized for age are indicated on the horizontal axes for given classes of 284,246 native-white wives, for 51,901 foreign-white wives, and for 39,511 colored wives of childbearing age enumerated in the total *Survey*. The birth rates are shown for groupings according to the usual occupational status of the head, for

[8] Notestein, F. W.: Differential Fertility in the East North Central States. The Milbank Memorial Fund *Quarterly*, April, 1938, xvi, No. 2, pp. 173-191.

[9] Innes, J. W.: Class Birth Rates in England and Wales, 1921-1931. The Milbank Memorial Fund *Quarterly*, January, 1941, xix, No. 1, pp. 72-96.

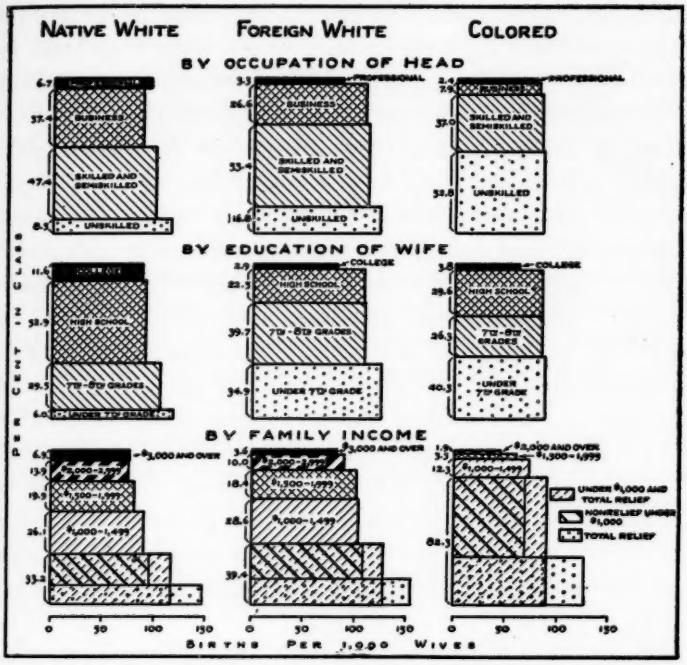


Fig. 1. Birth rates in 1935 by specified socio-economic classes in relation to proportionate importance of the classes within each color-nativity group. Urban wives of childbearing age in the National Health Survey. Birth rates standardized for age.

groupings according to educational attainment of the wife, and for groupings according to family income during the *Survey* year. For each color-nativity group and for each type of classification, the percentage distribution of wives in the sample is indicated on the vertical axis. (In other words, the percentage distribution for each of the nine sections totals to 100.)

In considering the distribution of the sample along the three socio-economic lines, certain factors need to be kept in mind. As previously stated, the *Survey* was carried out during the fall and winter of 1935-1936. The family income status had reference exclusively to the twelve months preceding enumeration, approxi-

mately the year 1935, and therefore tends to reflect the effect of the depression. The occupational classifications, on the other hand, referred to the *"usual"* occupation of the household head, regardless of his employment status at the time of the *Survey*. The distributions according to educational attainment were even less affected by the depression than were those by occupation, since these were based on the accomplished fact of school attendance of married women.

It should also be remembered that the samples were restricted to families represented by married women of childbearing age. Hence, the distributions were different from those which would be expected for total populations or for married women of all ages. As previously stated, too, the sample was unduly weighted by families from large cities. However, tests have indicated that the distributions in Figure 1 would not be substantially changed by adjustment for the existing under-representation of small cities.[10] On the whole, the distributions along socio-economic lines presented in Figure 1 are believed to be fairly representative of the situations during 1935-1936 for all urban wives of childbearing age of given nativity and color.

Several points of interest stand out in Figure 1. As expected, regardless of whether the distributions are made by occupational status of the head, by education of the wife, or by family income, the group of native-white wives stood in most favorable position and the colored wives in least favorable position. On the occupational basis, the proportion classed as wives of unskilled laborers was about 9 per cent for native whites, 17 per cent for foreign whites, and 53 per cent for the colored wives. On the educational basis, the proportion reporting less than 7th grade in formal schooling was 6 per cent for native whites, 35 per cent for foreign whites, and 40 per cent for colored wives. On the income basis, the proportion report-

[10] Experimental adjustments for under-representation of small cities have in most instances slightly increased the proportions in the least privileged classes and correspondingly decreased the proportions in the most privileged classes, but had little effect upon intermediate classes. The composition of the samples along socio-economic lines, by region and size of city, will be discussed in a later report.

ing incomes of less than $1,000 or relief status during 1935, was 33 per cent for the native whites, 39 per cent for the foreign whites, and 82 per cent for the colored wives.

The chart also emphasizes the relative unimportance of the topmost classes as defined in these classifications. Among the native whites, wives of professional men constituted about 7 per cent of the sample, wives reporting college attendance about 12 per cent, and wives reporting family incomes of $3,000 and over, about 7 per cent. From the population point of view, the magnitude of the rate for native-white wives of professional men is not of primary importance. The importance of the reversal in the order of the professional and business classes with respect to marital fertility stems rather from the low level of the rate for wives of business men, constituting over one-third of the native-white sample. In fact, the reversal probably arose from sharp declines in the fertility within the business class rather than from increases in the fertility of wives of professional men.[11]

Attention may be directed to the similarity in birth rates but to differences in proportionate importance of native-white classes ranking lowest with respect to occupational status, educational attainment, and family income. In the three respective types of classifications almost precisely the same birth rates were derived for wives of unskilled laborers, wives reporting less than 7th grade schooling, and wives reporting family incomes of less than $1,000 or relief. Yet, whereas the unskilled and the "under 7th grade" groups, respectively, comprised only 9 and 6 per cent of the total native-white sample, the "under $1,000 and total relief" group comprised one-third of the sample.

Among the foreign-white wives, the average birth rates were consistently in inverse relation to occupational, educational, and in-

[11] Innes has provided definite evidence that in England and Wales the reversals in the order of the topmost classes with respect to fertility arose from differential rates of decline in birth rates during 1921-1931. There was no increase in birth rates for any class during this period. *See* Innes, *op. cit.*, pp. 78-80.

come status. The upper extreme classes, however, were relatively unimportant, even less so than among native whites. Among foreign whites the lower extreme classes by occupational and educational status, as well as by income status, assumed noteworthy importance. As among native whites, the birth rates for the unskilled, the under 7th grade, and the "under $1,000 and total relief" classes were about the same in magnitude. For a true perspective of the importance of class differences in fertility among foreign-born white married women in this country it is, of course, necessary to keep in mind that this total segment of our population is rapidly passing out of the childbearing span. The figure shows the internal distributions and differential birth rates in a decreasing sector of our population.

For the urban colored married women, it is seen at a glance that existing class differences in marital fertility were of small importance. The faintly discernible inverse relation between occupational status and birth rates has little practical importance because about 90 per cent of the wives fell into the two laboring classes, and there was no appreciable difference between birth rates of the skilled and unskilled workers. On the educational basis, the birth rate among wives reporting college attendance was conspicuously low in relation to rates for the remaining women, but college wives constituted less than 4 per cent of the total sample of urban colored married women and there was lack of substantial differences in the birth rates of the bulk of colored wives at lower educational levels.[19] In the classification by income, there was found rather sharp lowering of the birth rates with improved status, but less than one-fifth of the

[19] An analysis by specific grade of schooling below high school level, indicated that the birth rate for none of these detailed groups except the illiterate—no schooling whatsoever—surpassed that for the high school wives by more than 5 per cent. The birth rate for the illiterate wives was 16 per cent higher than that for the high school class.

As for the native whites, subdivision of the "under 7th grade" group into the 6th, 5th, 4th, and "under 4th," disclosed no internal variation in birth rates below the 7th grade level. The "under 4th" group, however, was too small to afford reliable rates for subdivisions of this group. A similar procedure for the foreign whites revealed marked instances of internal variation below the 7th grade level, but these were not systematic. *See* footnote 4, pp. 141-142.

colored wives reported incomes above $1,000, and only about 2 per cent reported as much as $2,000.

Differential Birth Rates within Socio-Economic Classes

Attention may now be turned to the character of variations in birth rates within given socio-economic classes. For a long time students of population have emphasized that there are rather wide differences in economic and cultural conditions of families within a given class. The "business" class, for instance, contains agents, clerks, and owners of one-man enterprises, as well as the more affluent proprietors. Of possibly more value than finer subdivision of the data by a single attribute, however, are cross-classifications on the basis of two or more attributes. The latter type of procedure not only affords indications of intra-group differences in birth rates, but may suggest the relative importance of different factors associated with fertility. Such cross-classifications have been made for studies of differential fertility in Sweden,[13] but domestic studies of this nature have thus far been few and limited.[14] It is hoped that studies of this type will be forthcoming from the 1940 Census.

The tabulations of fertility data for married women in the *Survey* permitted one cross-classification by occupation of the head and by education of the wife, and one by occupation of the head and family income.[15] The present analyses of these data will be restricted to the

[13] Edin, K. A. and Hutchinson, E. P.: Studies of Differential Fertility in Sweden. London, P. S. King and Son, Ltd., 1935, 116 pp.

See also data compiled by C. Tietze for *Population Index*, January, 1940, vi, No. 1, pp. 72-73.

[14] For suggestive results based upon small samples for selected cities, *see* Notestein, F. W. and Kiser, C. V.: Factors Affecting Variations in Human Fertility. *Social Forces*, October, 1935, xiv, No. 1, pp. 32-41.

See also Griffin, H. C. and Perrott, G. St.J.: Urban Differential Fertility during the Depression. The Milbank Memorial Fund *Quarterly*, January, 1937, xv, No. 1, pp. 75-89.

An intensive study based upon special tabulations from the 1930 Census for one county has recently appeared. *See:* Thompson, W. S., *et al.*: Average Number of Children Per Woman in Butler County, Ohio, 1930. Bureau of the Census, in cooperation with the Scripps Foundation for Research in Population Problems. Washington, 1941, 81 pp.

[15] Mechanically, this was done by tabulating each of the four broad occupational classes by educational status and retabulating them by income. This did not provide a cross-classification by education and income.

surveyed native-white wives of childbearing age, of which there were 284,246. The cross-classifications thus afforded four types of analyses, as follows:

A. Variations in birth rates by educational status, within occupational groups;

B. Variations in birth rates by occupational status, within educational groups;

C. Variations in birth rates by occupational status, within income groups; and

D. Variations in birth rates by income status, within occupational groups.

It should be emphasized at the outset that complete constancy of one factor is not attained in the intra-group analyses. For instance, in the subdivision of the business class according to educational status of the wife, the college class is undoubtedly selective with regard to "upper" business pursuits, whereas the lower educational groups are disproportionately weighed by "petty" business families. Thus, we can speak only in approximate terms regarding "constancy" or "similarity" with respect to given characteristics.

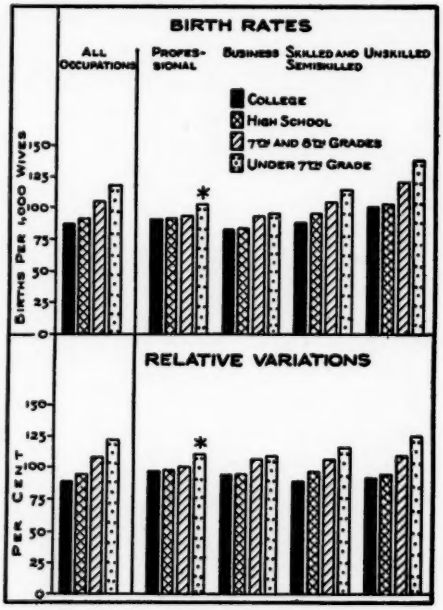
A. *Variations in Birth Rates by Educational Status, within Occupational Groups.* In the top panel of Figure 2, birth rates standardized for age are shown according to educational status within each of the four broad occupational classes. Within three of the occupational classes there was virtually no difference between the birth rate for wives reporting college attendance and that for wives reporting high school status. Aside from this, however, there is the appearance of increasing strength of the inverse relation between educational attainment and fertility of married women as one proceeds from upper to lower occupational levels. This appears to be true on a relative as well as an absolute basis, as indicated in the lower panel where the rate for each educational class within an occupational group is expressed as a per cent of the base rate[28] for the total occu-

[28] For this purpose the base rates for the several occupational classes were adjusted for

(Continued on page 157)

pational group. Whether or not there is any principle of increasing strength of the inverse relation between educational status and fertility, it is clearly apparent that the range of variations was much less within the two white-collar classes than within the two laboring classes.

Fig. 2. Birth rates in 1935 and their relative variations by educational attainment of the wife within groupings by occupation of the head: Native-white urban wives of childbearing age in the National Health Survey. Birth rates standardized for age.



*This birth rate is based on 171 cases. Bases for remaining birth rates for cross-classified groups shown above range from 679 to 64,009 cases.

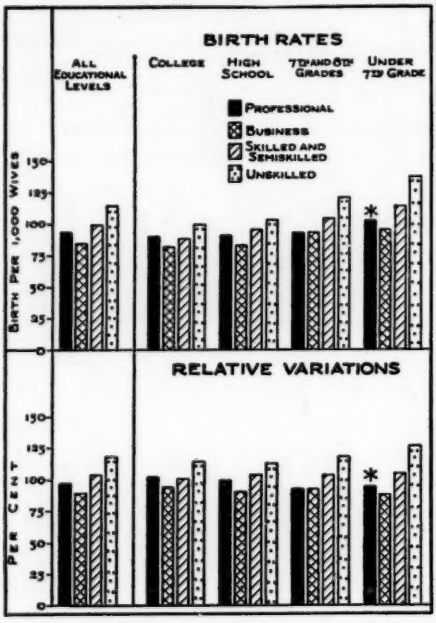
It is perhaps logical to expect smaller ranges of variations in birth rates by educational status within groups homogeneous with respect to occupational class than in the total sample regardless of occupational status. This was found definitely to be the case in so far as the two white-collar classes are concerned. The range of the variations by educational status was a little smaller in magnitude within the skilled and semi-skilled sample than within the total, but possibly a little greater within the unskilled class than within the total sample.

B. *Variations in Birth Rates by Occupational Status, within Edu-*

internal differences in educational composition. This was done by weighting the rates for component educational classes within each occupational group according to the proportionate importance of the given educational classes in the total sample of native whites. Corresponding procedures were followed in the remaining analyses of relative variations in fertility within classes.

cational Groups. Reciprocal comparisons of the foregoing data are presented in Figure 3 showing variations in birth rates by occupational status of the head, at successively lower levels of educational attainment of the wives. The pattern of differences in birth rates by occupational status, previously described for all native-white wives, appears to persist in virtually the same form at each level of educational status. Within three of the educational groups the rate for wives of professional men surpassed that for wives of business men, and in the remaining division (wives reporting 7th-8th grade) the birth rates for the professional and business classes were equal.

Fig. 3. Birth rates in 1935 and their relative variations by occupational class of the head within groupings by educational attainment of the wife: Native-white urban wives of childbearing age in the National Health Survey. Birth rates standardized for age.

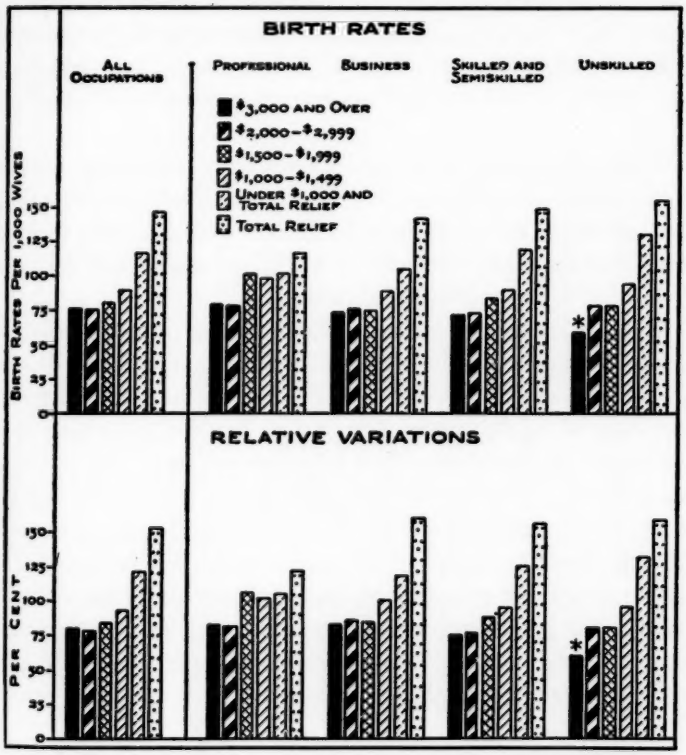


*See asterisk note, Figure 2.

On an absolute basis the ranges between lowest and highest birth rates (business and unskilled) were noticeably wider among wives below high school status than among those above this level of formal education. This type of difference in spread held true to a slight extent on a percentage basis, but the most striking indication from the lower section of Figure 3 is the similarity in the relative spread of the birth rates by occupational status at different levels of educational attainment.

C. *Variations in Birth Rates by Family Income Status, within Groups of Specified Occupational Class.* In the total sample of native-white wives the inverse relation between birth rates and family income status did not extend into the upper income brackets (Figure 4, upper left). The birth rate for wives reporting incomes of $3,000 and over was no lower than that for wives reporting incomes of $2,000-2,999. This similarity in the rates for the two upper income

Fig. 4. Birth rates in 1935 and their relative variations by family income status within groupings by occupation of the head: Native-white urban wives of childbearing age in the National Health Survey. Birth rates standardized for age.



*This birth rate is based on 152 cases. Bases for the remaining birth rates for cross-classified groups shown above range from 717 to 52,683 cases.

groups held true within the professional, business, and skilled classes, considered separately. The exception to this type of similarity within the unskilled class may be due to small sizes of the samples but, as will be explained later, somewhat artificial selections of the sample may be involved with regard to low fertility of unskilled laborers in the "$3,000 and over" income class.

More generally, the inverse relation between birth rates and income status was least prominent among wives of professional men. Not only was the actual and the relative range of rates of less consequence than in any other occupational class, but there were only two levels of birth rates by straight income status within the professional class: that for the two groups reporting incomes of $2,000 and over, and that for the three divisions reporting incomes of less than $2,000.[17]

Within the business class similar birth rates were found for the three subdivisions with incomes in excess of $1,500. Aside from this, the "staircase" picture of rising birth rates with declining income status was about as prominent on a relative basis as that observed within the skilled and unskilled classes.

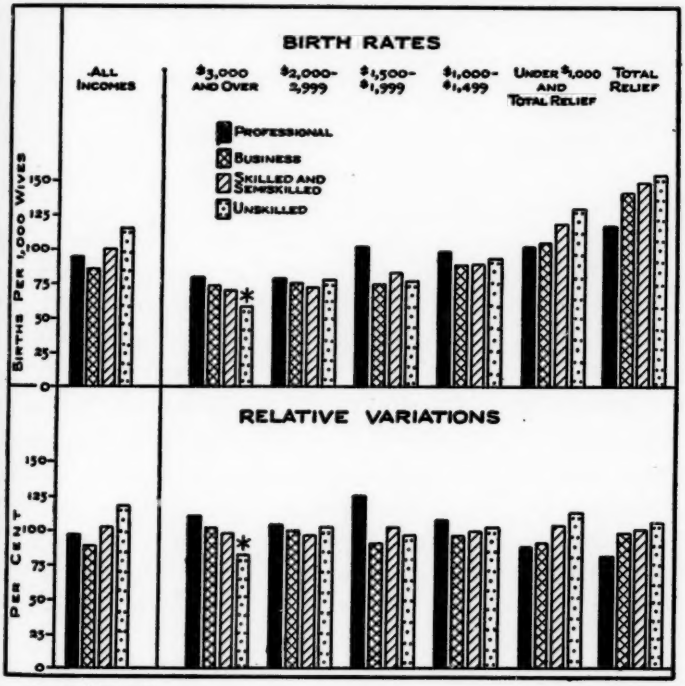
D. *Variations in Birth Rates by Occupational Status, within Income Groups.* Perhaps the most striking chart in this series is Figure 5, showing variations in birth rates by occupational status at different levels of family income. One notices first the appearance of a systematic change from a direct to an inverse association between occupational status and fertility as one proceeds from the highest to the lowest income brackets. For reasons to be discussed presently, however, the complete and rather marked positive association within the income group "$3,000 and over" may arise from selective factors. The point emphasized here is that the *inverse* association between birth rates and occupational status was completely and markedly manifested only within the two lowest economic groups

[17] The rate computed separately for relief recipients alone, however, did provide an additional level within the professional class.

(under $1,000 and relief cases, and relief cases considered separately). Within each of the three groups in the $1,000-2,999 range there was lack of substantial difference in birth rates by occupational status. The most conspicuous exception was the higher birth rate for wives of professional men reporting the modest family income of $1,500-1,999.

There is the suggestion from the lower panel of Figure 5 that on a relative basis the strength of the *direct* association between birth rates and occupational status at the highest income level may be about as great as that of the *inverse* association at lowest levels of in-

Fig. 5. Birth rates in 1935 and their relative variations by occupational class of the head within groupings by family income: Native-white urban wives of childbearing age in the National Health Survey. Birth rates standardized for age.



*See asterisk note, Figure 4.

come. It is important to note, however, that the difference between the rates for no two occupational classes within the "$3,000 and over" group was statistically significant to the extent of being twice the standard error of the difference. This held true for alternate and extreme classes as well as for successive classes. On the other hand, among all wives reporting family incomes of less than $1,000 regardless of relief, the only inter-class difference failing to stand up as statistically significant by the above criterion was the slight one between the rates for the professional and business classes. When relief recipients were considered separately, the difference between the rates for the business and skilled and that between the skilled and unskilled classes were scarcely significant in a statistical sense, but the remaining inter-class variations were from two to three times greater than the standard errors of the differences.

It is doubtful, however, that the case for the direct association between occupational status and fertility at upper income levels can be dismissed simply on the basis of lack of statistical significance. The pattern of the variations appears too systematic to arise from chance alone. A restriction of the data to wives reporting $5,000 and over revealed even wider differences in the same direction by occupational class, in so far as the professional, business, and skilled classes were concerned, and in this case the rate for wives of professional men was significantly higher than that for the wives of business men.

There is, however, the possibility that the direct association between occupational status and fertility at highest levels of family income arises in part from selective and artificial situations. It is clarifying in this connection to consider the conditions under which the skilled and unskilled families might qualify for inclusion in the "$3,000 and over" category. Certainly, few would qualify if the income status were based upon earnings of the husband alone. The "family income" status, however, was determined by the combined incomes of the total family, i.e., the head of the household and resi-

dent persons related to the head by blood, marriage, or adoption. Thus, family income status could be augmented above that of the husband's earnings by earnings of resident children of working age, by gainful employment of the wife, and by earnings of resident relatives. In the case of married couples residing with their parents, the income status would, in reality, be set by the combined incomes of the two families.[18]

The cases where the family income of laboring families amounted to $3,000 and over, solely as a result of contributions of unmarried children, however, were probably very few in the present samples restricted to families represented by married women under 45 years of age. The more important conditions of augmented income status were probably (1) gainful employment of wives, and (2) residence of married couples with their parents and parents-in-law or other relatives. The point to be emphasized here is that selections with respect to gainful employment of women and selections with respect to secondary families carry with them selections with respect to low fertility. There is pretty good evidence that fertility levels are unusually low among women employed outside the home and also among couples residing with their parents.[19]

No tabulations were made for the total sample to test the actual bearing of the above factors on the direct association between occupational status and fertility within the highest income group. However, such tabulations were made for native-white wives of childbearing age enumerated in four cities[20] of the *Survey*, and these yielded fairly convincing evidence of the relevance of the above-described selective factors. For a top-income class it was necessary to use $2,000 and over, but even within this group the birth rates decreased sharply with lowering of occupational class of the head.

[18] Since the present sample is restricted to women under 45, families of the above type would be represented mainly by the younger couples.

[19] Kiser, C. V.: Pitfalls in Sampling for Population Study. *Journal of the American Statistical Association*, September, 1934, xxix, No. 187, pp. 250-256.

[20] The four cities were: Fall River, Massachusetts; Newark, New Jersey; St. Paul, Minne-

(Continued on page 164)

The interesting point, though, is that with lowering of occupational status within this top-income class, there were sharp increases in proportions of families having two workers or more; the wife gainfully employed; relatives in residence; or a married couple forming a secondary family living in the home of parents. In contrast, within the lowest income group there was little difference by occupational class in the proportion of families with multiple gainful workers, relatives, etc. Within this lower income group the rate for the small professional class provided the only exception to the inverse relation of birth rates to occupational status of the head.

In general, then, there is little doubt about the presence of selective factors in the direct association of birth rates and occupational status at upper income levels. These tests for part of the sample, of course, afford no assurance that selective factors were entirely responsible for the direct association, especially in so far as the total sample, Figure 5, is concerned.[21] In fact, it seems quite likely that the

sota; and Oakland, California. The total number of native-white wives of childbearing age included in the *Survey* for these cities was 17,728.

The following table is restricted to wives in two extreme income classes, each subdivided according to occupational status of the head.

	$2,000 and Over Income Status				Under $1,000 and Total Relief			
	Professional	Business	Skilled and Semi-Skilled	Unskilled	Professional	Business	Skilled and Semi-Skilled	Unskilled
Number Families Involved	613	2,370	865	55	108	1,029	3,843	748
Per Cent:								
Two Workers or More	19	33	56	84	20	19	26	23
Wife Gainfully Employed	12	15	20	29	8	9	12	9
Family Includes Relatives	15	25	46	62	11	11	13	13
Woman in Sample is Daughter or Daughter-in-Law of Head	2	6	17	33	1	1	3	4
Births per 1,000 Wives	103	74	67	—	136	115	138	145

[21] Dr. Christopher Tietze's compilation of Swedish data, for instance, indicated that in 1930 there was a clear-cut positive association of marital fertility with income within the higher educational groups of proprietors and salaried employees in nonagricultural pursuits. In this case the index of fertility was children ever born per married couple, and the income status and other attributes related to the husband. *See Population Index*, January, 1940, vi, No. 1, pp. 72-73.

higher rate for the professional than for the business group at highest income level is not altogether a statistical artifact, since this relation held true in the classifications by occupation alone, i.e., without regard to income status.

Relative Importance of Specific Factors Affecting Fertility

Mindful of the complexity and interrelation of factors affecting human fertility, we may nevertheless make a tentative analysis of the data from the standpoint of the relative importance of the three variables considered in this study. First of all, Figures 2-5 have collectively attested to the independent bearing on fertility of the three factors: occupational class of the head, educational attainment of the wife, and family income. In each type of cross-classification there was at least some instance of an inverse association between birth rates and socio-economic status. This inverse relation was generally most pronounced within the lower classes of the primary division, and in the case of income classifications it was confined to the lower groups (*see* Figure 5).

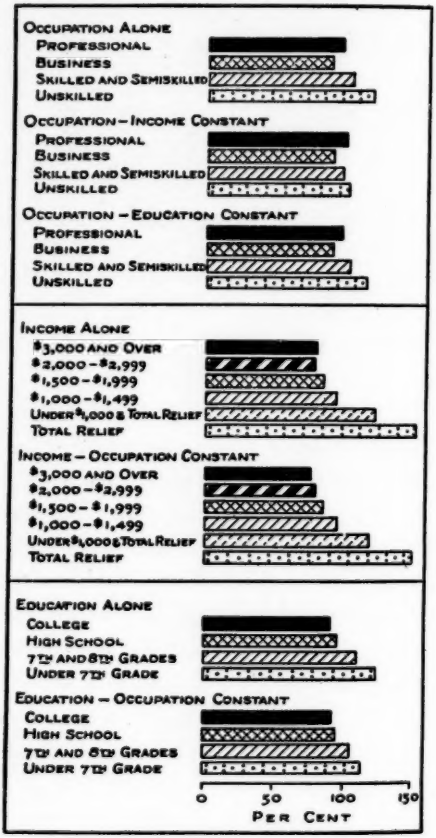
Comparison of Figure 5 with the other charts, however, suggests that variations in fertility were more closely correlated with amount of income than with occupational status of the head or with educational attainment of the wife. When analyses were restricted to wives of similar income status, as in Figure 5, the inverse relation of fertility to occupational status virtually disappeared except at the lowest income levels. In fact, within each of the intermediate income groups there was striking equality of birth rates for the component occupational classes. This type of equalization occurred in no other cross-classification and is strongly suggestive of the particularly close relation of income to fertility in the *Survey* data.

In view of the close association of the three variables themselves and in recognition of the multiplicity of factors underlying human fertility, it would be an over-simplification to say that income was a more ***important*** factor than occupational status of the head or edu-

cational attainment of the wife. A more precise statement would be that amount of income more sensitively reflected the network of conditions underlying fertility during the *Survey* year than did either usual occupational status or educational attainment. Viewed in this light, the results appear reasonable, for the index of fertility and that of income both referred exclusively to the *Survey* year, the depression year of 1935.[20] As previously described, the occupational classification was based upon the *usual* status of the head, and the educational attainment of the wife is, of course, an even more permanent attribute.

Another approach to the question of relative importance of the three variables is made in Figure 6 which is derived from the data in Figures 2-5. However, instead of showing variations in

Fig. 6. Relative variations of birth rates by specified socio-economic attribute considered alone, and average effect of standardizing for another variable: Native-white urban wives of childbearing age in the National Health Survey.



[20] The income data coincide in time with birth dates of all infants enumerated, and in approximately one-fourth of the cases coincide with dates of conception.

birth rates among subclassifications of a given group, it presents the *average* effect of standardization for one variable on the relative spread of birth rates according to another criterion of socio-economic status. Within each of the three panels the relative range of the birth rates according to a specified attribute is shown; first, regardless of other variables, and then, after the influence of another variable is ruled out by standardization.

In the top panel of Figure 6 the relative spread of the birth rates by occupational class of the head is shown, first, *regardless* of other variables; next, with income "held constant";[28] and next, with educational status "held constant." In this instance, the spread of the birth rates by occupational status can be used as a medium for comparing the effect of standardizing for income with that of standardizing for education. It is clearly apparent that the average relative spread of the rates by occupational status was reduced to a greater extent by standardizing for income than by standardizing for educational status of the wife. This might be taken as suggestive evidence that fertility differentials during the *Survey* year were more closely associated with income than with educational status. It should be recognized, of course, that the leveling effect of standardization for income results in part from an averaging of the opposite types of variations in birth rates by occupational status at the two extremes of income status, observed in Figure 5. Nevertheless, the average leveling-off does truly reflect the lack of substantial variations by occupational status within the central income groups.

Figure 6 also indicates that in these data the amount of income was more closely related to fertility differentials than was occupational class of the head. This is brought out in the comparison of the reciprocal effects of standardization. Thus, the top panel indicated that standardization for income resulted in a sharp reduction of the spread of birth rates according to occupational class. In contrast, the

[28] The mechanics of standardizing was that of weighting the component rates by income within each occupational class by the income distribution for the total sample. Corresponding procedures were used for the remaining standardizations.

middle panel revealed that standardization for occupation effected no appreciable change in the average spread of the rates by income.

The virtual equality in the importance of occupational class of the head and educational attainment of the wife in their relations to fertility differentials is suggested by comparing the results in the bottom panel of Figure 6 with the appropriate sections in the top panel. From the bottom panel it will be noted that the range between extreme rates by educational status of the wife was narrowed a little by standardizing for occupational status of the head, but the general impression is the lack of substantial change. Since the reverse procedure (top panel) of standardization for educational attainment of the wife likewise yielded little reduction in the average relative spread of birth rates by occupational class, there is the suggestion that educational attainment of the wife and occupational status of the head were of about equal importance in so far as variations in birth rates are concerned. As in the other comparisons, however, it is necessary to keep in mind that Figure 6 is based on averages and therefore conceals some of the cross-relationships disclosed in the preceding charts.

There are suggestions of the close correlation of income with fertility, apart from, and in some respects more convincing than, those afforded by the cross-classified data. As described in a previous report, the *Survey* data for native-white married women residing in cities of the Pacific Coast, where birth rates are generally low, failed to indicate much in the way of differences in fertility along occupational or educational lines. In the classification of the women by income, however, the inverse association was strongly evident, at least in so far as broad outlines are concerned.[84]

Some further indication of the closer relation of income than of occupational or educational status to fertility differentials in this study may be found in the analysis of variations in fertility in relation to proportionate importance of the classes considered. As pre-

[84] *See* footnote 4, p. 151.

viously pointed out (Figure 1), whereas one-third of the native-white wives fell into the lowest income group (under $1,000 or relief), only 6 per cent reported less than 7th grade in schooling, and only 9 per cent were wives of unskilled laborers. And yet, the birth rates for the three groups were essentially the same. In other words, the birth rate was just as high for the third of the sample ranking lowest with respect to income as for the 6 or 9 per cent ranking lowest with respect to educational or occupational status.

There are also suggestive indications from Figure 1 that among native-white wives the total range of the birth rates was greater by income status than by occupational or by educational status.[25] This held true apart from the high rate for relief recipients and did not arise wholly from finer subdivisions of the sample by income. On the occupational basis, the lowest rate among native whites was found for wives of business men, constituting 37 per cent of the sample. The total range of the rates by occupational status would probably be increased somewhat by subdivision of the business group. It may be pointed out, however, that the average birth rate for the three classes reporting incomes above $1,500, and comprising 40 per cent of the sample, was about 8 per cent lower than the birth rate for the total business class. Considering only the wives ranking in the topmost groups as given in this figure, we find that the 7 per cent of the native-white sample with incomes of $3,000 and over had a birth rate 18 per cent lower than that for the 7 per cent classified as wives of professional men. The birth rate for wives in the top group with respect to income was 11 per cent lower than that for wives reporting college attendance (constituting in this case 12 per cent of the total sample).

It should be emphasized that it is not the purpose of this paper to advance the thesis that family income is a factor universally more

[25] It is also pertinent to recall that whereas only very slight inter-class differences in fertility were observed among colored wives classified by occupational or educational status, the inverse relation between fertility and income status was consistent and well marked. As previously stated, however, relatively few of the colored wives fell into the "upper" classes by any criterion of socio-economic status.

important to fertility differentials than occupational status or educational status. As used here, birth rates related to the single year preceding enumeration. Since family income related specifically to the same period, income status provided a more sensitive barometer of socio-economic status during the year under study than did either "usual occupational class" or educational attainment. Indeed, it seems probable that different results would have been secured had the index of fertility been based upon total number of children ever born, or had the *Survey* been made during a period less characterized by depression conditions. It is, nevertheless, of interest that for the year 1935 the data indicated no substantial inverse relation between occupational status and birth rates among married women in similar income classes above the $1,000 level. The sharp inverse association of fertility and usual occupational status among families receiving less than $1,000 possibly reflects the greater tendency of white-collar workers deliberately to prevent births during times of severe economic stress.

In conclusion, emphasis should be placed upon the need for additional studies of the factors underlying variations in human fertility. Already there are rumblings of the need for a national population policy. In the formulation of such a policy cognizance should be taken of two types of problems: the extremely high birth rates in poor rural areas, and the low birth rates in urban centers. Without implying that the former problem is simple of solution, one can safely state that much of it arises from sheer inexperience with contraception. The indicated approach is in large part the mechanical one of making contraception available. The latter problem, that of low birth rates in cities, introduces a different set of complexities about which we know little. Thus, when it comes to measures designed to encourage larger families among groups *free to choose*, we run into a wall of ignorance concerning the interplay of social and psychological factors affecting size of family. Yet such knowledge is essential if future programs are to be sane and effective.

CONTRACEPTIVE SERVICE IN THREE AREAS

PART I. THE CLINICS AND THEIR PATIENTS

REGINE K. STIX, M.D.[1]

INTRODUCTION

WITH the recognition of the importance of contraception as a maternal health service, new contraceptive clinics are being established in many sections of the United States, a large proportion of them under the auspices of state or local health services. Up to the present time, most of the newer clinics have patterned their policies after those of the older clinics established by the birth control movement. The wisdom of this procedure is open to question, since it is not known whether the rather rigid policies of the older clinics are the best for all types of communities, or whether it might be better to modify them to suit individual and community needs.

In an attempt to learn just how various types of populations were served by existing contraceptive services, the Milbank Memorial Fund has completed studies of three contraceptive clinics in widely differing sections of the United States. One of them, the Birth Control Clinical Research Bureau (now the Margaret Sanger Research Bureau of the Birth Control Federation of America) is in New York City. It was the first contraceptive clinic established in this country and has, to a great extent, set the pattern for the policies of the organized birth control movement. The other clinics are both independent of the Birth Control Federation. One, the Cincinnati Maternal Health Clinic, operates under the auspices of the local Academy of Medicine; the other is a referral service in the Spartanburg General Hospital in Spartanburg, South Carolina, and is a regular clinic of the Spartanburg County Department of Health.

Detailed studies of the first two clinics have already been pub-

[1] From the Milbank Memorial Fund.

lished.[2] In the present report, data from the Spartanburg clinic are presented and a comparative evaluation is made of the services of the three clinics in relation to the needs of the patients served by each.

The Records Used for Study

The records and methods of study differed slightly for the three clinics, but essentially the same information was available for the families in all three regions. In New York, the large number of patients and the extent of the area served by the clinic (the whole of New York City) necessitated selecting a homogeneous and easily accessible group for study. The group chosen consisted of all the women from the Borough of the Bronx who attended the clinic between January 1, 1931 and June 30, 1932, and who were still living in the Bronx between one and two years after their initial clinic contact. Nine hundred and ninety-one women were located and interviewed in their homes by the author.[3]

In Cincinnati the procedure differed slightly in that all the women who had attended the clinic in the five years between its inception in November, 1929 and December 31, 1934 were sought for interview. A trained nurse interviewed 1,621 patients in their homes in 1935 and 1936.[4]

In Spartanburg, records were secured for the first 990 patients who attended the clinic which opened in July, 1935. Unlike the procedure in the other two studies, the detailed records were made at the time of each patient's initial contact with the clinic. Complete follow-up records were kept as patients returned, while records for those who failed to return in the year 1939 and had not moved away were completed by a social worker who visited them in their homes.

[2] Stix, Regine K. and Notestein, Frank W.: Controlled Fertility. Baltimore, The Williams and Wilkins Co., 1940, 202 pp.; Stix, Regine K.: Birth Control in a Midwestern City. The Milbank Memorial Fund *Quarterly*, January, April, and October, 1939, xvii, Nos. 1, 2, and 4, pp. 69-91, 152-169, and 392-423.

[3] For details of case-finding and selections involved, *see* Stix and Notestein, Chapter III and Appendix I.

[4] For further details, *see* Stix, 1939, pp. 71-72.

The records of the New York clinic patients contained social and economic information and a complete fertility record for the period between marriage and the date of interview. The record included the date and type of termination of each pregnancy, information concerning morbidity associated with it, if any, and data on the use of contraception which preceded it.[5] Medical information was limited to that elicited for the fertility history.

The Cincinnati records were similar to those obtained in New York, but contained, in addition, a brief medical history and a check record for some of the findings of the pelvic examination given the patient on her initial clinic visit. For those cases referred to the gynecological clinic run by the Committee on Maternal Health, detailed records of pelvic examinations were available.

The records of the Spartanburg patients included all the information available for patients in Cincinnati and New York and, in addition, a complete record of the pelvic examination given each patient, of the diagnosis made at the referring clinic, and of laboratory procedures, which included a blood test for syphilis (Wassermann and/or Kahn), cervical and urethral smears, and an urinalysis.

The Social and Economic Background of the Patients

The three clinics serve three entirely different population groups. The patients of the New York clinic were selected for study because they were fairly representative racially and religiously of the great majority of the patients who attended the clinic during the period of study. More than half of the women interviewed were foreign-born and those who were native-born were preponderantly of foreign parentage. Two-thirds of the couples were Jewish, a sixth of them were Catholic, and the remaining sixth consisted of Protestant couples and those in which the religious affiliations of husband and wife differed. The usual occupations of the husbands were almost equally divided between white-collar and manual work. In 1929, the median annual income of the group was $2,300 and only four

[5] *See* Stix and Notestein, Appendix II.

families were on relief. In 1932 about one hundred families were on relief and the median income of the nonrelief families had dropped to $1,250. Most of the wives sought contraceptive information on their own initiative. Eighty-six per cent of them paid at least $2.00 for the service given them; 59 per cent $5.00 or more.

In Cincinnati, almost all the patients were native-born and 85 per cent were of native parentage. Nearly 75 per cent of those interviewed came from Protestant families and less than 4 per cent from Jewish families. The usual occupation of 81 per cent of the husbands was manual labor, and the remaining 19 per cent were white-collar workers. About one-fourth of the group were recipients of relief, and the median income of nonrelief families was approximately $1,100 per year. The clinics are maintained as referral services for women who can not afford the services of private physicians and who need contraceptive advice because of illness or poor social and economic conditions.

The patients selected for study in New York and Cincinnati were all white women; in Spartanburg, however, 46 per cent were Negroes. Both whites and Negroes were preponderantly native-born Protestants. Among the white husbands only about 5 per cent were urban white-collar workers, about 60 per cent were urban manual workers, and the remaining 35 per cent were farmers, of whom the majority were sharecroppers or tenants. Less than 1 per cent of the Negroes were white-collar workers; 62 per cent were urban manual workers, mainly unskilled; and 37 per cent were sharecroppers, farm tenants, or farm laborers.

The median annual income of the white urban families was about $600. Nearly three-fourths of the white rural families had no earnings at all, and the mean income for the rural group was only about $100 per year. The median annual income of the urban Negroes was about $400. About 60 per cent of the Negro farm families earned nothing and the mean income for the rural Negro group was about $125 per year.

The majority of the farms were described by their owners as "one-horse" farms. Most of the tenants and croppers paid one-third of the annual crop as rent, but about 20 per cent of the white and 40 per cent of the Negro tenants paid the owner one-half of the annual crop. Twenty-nine per cent of the white and 18 per cent of the Negro farmers owned or had an equity in one or more farm animals. Only twenty-five white families and eleven Negro families living on farms had automobiles of any sort.

It is evident from these figures that the Spartanburg clinic patients represent the lowest economic group, living at a bare subsistence level. Thirty-one per cent of the white women and 38 per cent of the Negro women had not even entered the sixth grade, and only 29 per cent of the white women and 17 per cent of the Negro women had had any high school education.

Most of the women were referred for contraceptive advice by county health nurses or from other clinics in the Spartanburg General Hospital. A few were sent by midwives or by physicians. Almost half of them were women with serious systemic disease, such as tuberculosis, syphilis, heart disease, or nephritis, and about one-third more were in generally poor physical condition from too frequent childbearing and malnutrition.

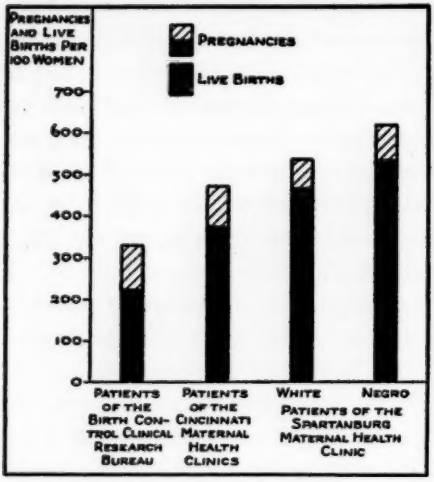
The outstanding differences between the three groups of patients are evident in the reasons for their seeking contraceptive advice. The New York women, a relatively comfortable group economically, were concerned about controlling their own fertility, and were willing to pay for expert contraceptive advice. The women in Cincinnati and Spartanburg were referred for advice because social workers, nurses, or physicians felt that their physical and economic condition contraindicated further pregnancy, at least temporarily.

The Preclinic Fertility of the Clinic Patients

The birth rates per 100 women of the white patients in New York City, Cincinnati, and Spartanburg, and of the Negro patients in

Spartanburg, are shown in Figure 1.[6] Although the clinic patients in each area were more fertile than women in the same area who were unselected with respect to a demonstrated interest in controlling their fertility,[7] the birth rates of the three clinic groups showed the usual economic, social, and regional differentials. The Spartanburg Negroes had the highest birth and pregnancy rates; the New York clinic patients, the lowest.

Fig. 1. Pregnancy and birth rates per 100 women for four groups of women prior to clinic attendance. (Rates standardized for age.)



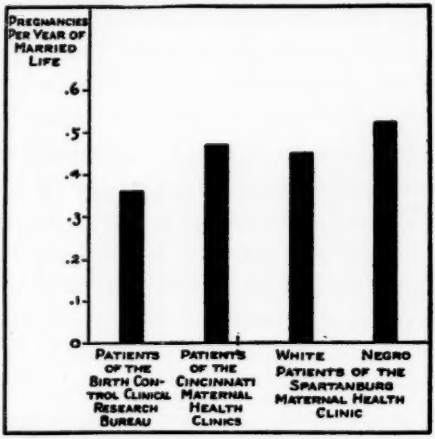
The total pregnancy rates per year of married life for the experience of the clinic patients before they sought contraceptive advice are shown in Figure 2. During a ten-year period in which the average New York clinic patient would have had 3.6 pregnancies, the average Cincinnati patient would have had 4.7, the Spartanburg white patient 4.5, and the Negro patient 5.2.

[6] The rates are standardized to the age distribution of all married women aged 15-44 in the 1930 Census. Women under 15 and over 44 years of age were excluded from the tabulations.

[7] For comparisons of the fertility of clinic patients with that of other women from the same area *see* Stix and Notestein, pp. 12-15 (for New York); and Stix, 1939, Foreword to bound monograph, pp. IV-VI (for Cincinnati). In Spartanburg the number of children under 5 per 100 married women 15-44 years of age was 158 for white clinic patients and 70 for all the white women in the County at the time of the 1930 Census. For Negro clinic patients the rate was 172, while for all Negro women in the County in 1930 it was 59. The total number of live births per 100 urban white clinic patients aged 15-44 was 444. For a group with similar occupational status, interviewed in the neighboring city of Greenville during the Health and Depression Survey of the United States Public Health Service in 1933, the number of live births per 100 married women 15-44 was 347. (The birth rates were standardized to the age distribution of all married women aged 15-44 in the 1930 Census.)

The differences in the pregnancy rates per year of married life are less marked than those for the pregnancy rates per 100 women. For example, the pregnancy rates per 100 white women in Spartanburg were higher than those for the Cincinnati women, but the rates per year of married life were almost the same for the two groups. The difference between the two types of rate is associated with a marked disparity in the mean ages at marriage of the four groups of women. In New York the mean age at marriage was 21.8 years; in Cincinnati it was 19.8; for Spartanburg white women it was 18.8 years; and for Spartanburg Negroes, 18.2 years. For the average white patient in Spartanburg as compared with the average Cincinnati patient there was an additional year of marriage in which pregnancy might occur. Once married, however, the Spartanburg white woman and the Cincinnati patient had approximately the same chance of becoming pregnant in each year of married life.

Fig. 2. Total pregnancy rates per year of married life for four groups of women prior to clinic attendance. (Rates standardized for period of married life.)



An analysis of the factors underlying the differences between the birth and pregnancy rates of the four groups of clinic patients will show certain fundamental differences in their attitude toward the control of their fertility before they were referred for contraceptive advice. It has been shown previously that the most important factors associated with group differences in fertility are the prevalence and effectiveness of contraception and the prevalence of illegal abor-

tion.[8] In order to determine the influence of these factors, it is necessary first to determine what differences, if any, there were in the uncontrolled fertility of the groups under consideration.

The uncontrolled fertility of the four groups, expressed as pregnancies per 100 years of exposure to the risk of pregnancy, is a measure of the rate at which women in the three areas conceived when they made no attempt to use contraception and were not pregnant.[9] These rates are shown for the four groups under consideration in Table 1. The differentials are small but are in the opposite direction to the differentials for the total fertility in the three areas. When no attempt was made to use contraception, the rates of New York women were significantly higher than those of any of the other groups. The Cincinnati women, in turn, had rates significantly higher than those for both groups of Spartanburg women. It is obvious, therefore, that the high pregnancy and birth rates of the southern women were not associated with "biologically superior" fertility.

The small differences in the uncontrolled fertility of the groups under consideration may be attributed to a number of factors. The first is the differential prevalence of the types of pathology which might be expected to interfere with fertility. In the New York group about 20 per cent of the exposure during which no contraception was used was that of women with a history of serious pelvic infection or evidence of endocrine disorder. In Cincinnati about 28 per cent of the exposure without contraception was that of women with some similar type of pathology. In Spartanburg the percentages for both white and Negro groups were much higher than in either of

[8] Pearl, Raymond: THE NATURAL HISTORY OF POPULATION. New York, Oxford University Press, 1939, p. 244; Stix and Notestein, pp. 147-149; Stix, 1939, pp. 87-89.

[9] The number of years of exposure to the risk of pregnancy was derived, for each type of exposure, by aggregating the number of months of that type of exposure between marriage and the menopause, during which the women were living with their husbands and not pregnant, and dividing the total by 12. The rates were derived by dividing the number of pregnancies occurring in a given period of exposure to risk by the aggregate number of years of exposure in the period, and multiplying by 100 in order to secure a rate which could be expressed in whole numbers. For further discussion of the concept *see* Stix and Notestein, Appendix III.

Period of Married Life	White Patients of						Negro Patients of Spartanburg Maternal Health Clinic	
	Clinical Research Bureau (N.Y.C.)		Cincinnati Maternal Health Clinics		Spartanburg Maternal Health Clinic			
	Pregnancies per 100 years of exposure							
First Pregnancies	271		167		161		158	
All Later Pregnancies	105		93		71		82	
Years Since Marriage								
0- 4	114		99		78		90	
5- 9	102		94		72		84	
10-14	81		79		61		67	
15-29	69		67		54		63	
	Exposure in years and number of pregnancies							
	Exp. Yrs.	No. Preg.	Exp. Yrs.	No. Preg.	Exp. Yrs.	No. Preg.	Exp. Yrs.	No. Preg.
First Pregnancies	199.4	540	670.9	1,121	268.7	433	223.0	353
All Later Pregnancies	323.6	341	1,696.4	1,583	1,738.5	1,218	1,555.6	1,283
Years Since Marriage								
0- 4	197.5	225	987.7	980	663.9	520	680.7	616
5- 9	77.3	79	387.7	365	588.7	424	507.9	425
10-14	28.5	23	194.6	153	327.2	199	243.2	164
15-29	20.2	14	126.4	85	158.6	85	123.8	78

Table 1. Pregnancy rates for the noncontraceptive experience of four groups of women prior to clinic attendance.

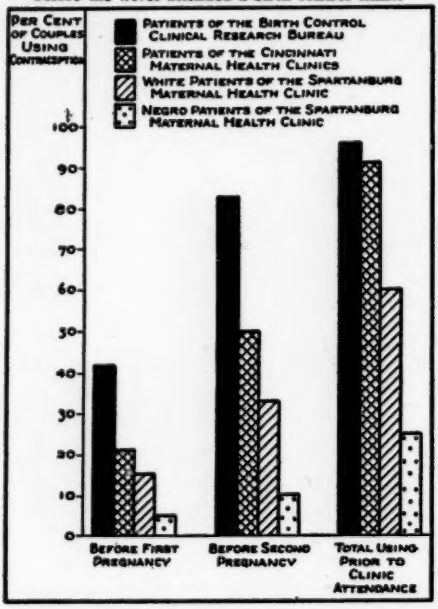
the other cities. About 45 per cent of the exposure of white women and 48 per cent of that of Negro women was that of women with pelvic or endocrine pathology or pellagra or syphilis. The rates of these women were much lower than those of women free from pathology, when no contraception was used.[30]

It was found also that the relatively low rates of the Spartanburg white women who were free from pathology were associated with

[30] For detailed discussion of these factors, *see* Stix and Notestein, pp. 38-39; Stix, Regine K.: The Medical Aspects of Variations in Fertility. *American Journal of Obstetrics and Gynecology*, April, 1938, xxxv, No. 4, pp. 571-580; Stix, Regine K.: Factors Underlying Individual and Group Differences in Uncontrolled Fertility. The Milbank Memorial Fund *Quarterly*, July, 1940, xviii, No. 3, pp. 239-256; Stix, Regine K.: Syphilis and Uncontrolled Fertility. *American Journal of Obstetrics and Gynecology*. (In press.)

periods of postpartum amenorrhea that were longer than those observed for Spartanburg Negroes or for the Cincinnati patients. When the exposure coinciding with postpartum amenorrhea was excluded from the experience of the women free from pathology in all three groups, the differences in noncontraceptive rates were greatly reduced.[11]

Fig. 3. Proportions of couples in three areas who were using contraception at various periods before the wives attended a birth control clinic.



In brief, the uncontrolled fertility of the New York patients was very high, while the high prevalence of pathology and the tendency to prolonged lactation among the Spartanburg patients were associated with comparatively low rates for periods during which no contraception was used.

Since the differences in the total preclinic fertility of the four groups under discussion could in no way be considered due to differences in "biological capacity," it is clearly evident that the differential prevalence and effectiveness of contraception is the next factor to be considered.

The period at which couples turned to the use of contraception varied in the three areas. Figure 3 shows the proportions of couples in the four groups who were using contraception at different periods

[11] Stix, 1940, pp. 248-253. The amount of nonpathological exposure without contraceptives for the New York group was too small to permit of this type of analysis.

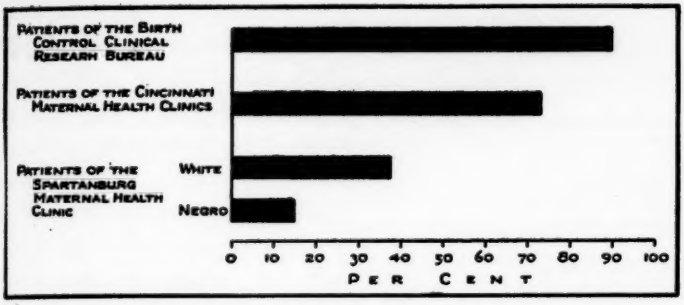

Patients of the Birth Control Clinical Research Bureau
Patients of the Cincinnati Maternal Health Clinics
Patients of the Spartanburg Maternal Health Clinic
White
Negro
0 10 20 30 40 50 60 70 80 90 100
Per Cent

Fig. 4. Proportions of exposure with contraceptives in the total preclinic exposure to the risk of pregnancy of four groups of women.

before the wives sought expert contraceptive advice. The New York couples used contraception earlier and more extensively than any of the others. The smallest proportion of users in each period was observed among the Negroes.

The proportion of the total preclinic exposure of each group during which contraception was used is shown in Figure 4. Before the wives attended a birth control clinic the New York couples had used contraception for about 90 per cent of their exposure to the risk of pregnancy; Cincinnati couples, 73 per cent; white couples in Spartanburg, 38 per cent; and Negro couples for only 15 per cent.

During their use of contraception the pregnancy rates of each group of women were significantly lower than their rates when no contraception was used. The rates are shown in Table 2 and they are compared with the noncontraceptive rates in Figure 5. The reduction in pregnancy rates achieved by the use of contraception was greatest among the New York women and least among the Spartanburg Negroes. In New York the use of contraception prevented 79 per cent of the pregnancies that would have occurred had no contraception been used for an equivalent period of exposure. In Cincinnati the effectiveness of the contraception used was 52 per cent; among the Spartanburg white women, 47 per cent; and among the Negro women, 28 per cent (Table 4).

Period of Married Life	White Patients of				Negro Patients of Spartanburg Maternal Health Clinic	
	Clinical Research Bureau (N.Y.C.)		Cincinnati Maternal Health Clinics		Spartanburg Maternal Health Clinic	
	Pregnancies per 100 years of exposure					
First Pregnancies	41		70		64	106
All Later Pregnancies	27		55		43	58
Years Since Marriage						
0– 4	32		62		48	62
5– 9	27		53		39	56
10–14	24		50		42	63
15–29	15		49		38	45
	Exposure in years and number of pregnancies					
	Exp. Yrs.	No. Preg.	Exp. Yrs.	No. Preg.	Exp. Yrs.	No. Preg.	Exp. Yrs.	No. Preg.
First Pregnancies	423.7	174	360.8	254	77.8	50	20.7	22
All Later Pregnancies	5,319.8	1,459	6,137.9	3,379	1,138.0	484	291.1	170
Years Since Marriage								
0– 4	1,961.1	634	2,032.0	1,264	376.1	180	100.3	62
5– 9	2,022.1	536	2,333.0	1,227	412.7	162	103.0	58
10–14	978.7	236	1,233.8	623	234.7	98	56.7	36
15–29	357.9	53	539.1	265	114.5	44	31.0	14

Table 2. Pregnancy rates for the experience with contraceptives of four groups of women prior to clinic attendance.

These differences in effectiveness were due partly to the types of contraception used in each area and partly to the diligence and effectiveness with which each type was used. Table 3 shows the distribution in the total exposure with contraceptives of the types of contraception used by each group, and Table 4 the effectiveness with which each of the three most commonly employed methods reduced the risk of pregnancy for each group of women.

The extent of the use of condom and of coitus interruptus did not vary widely for the white couples in the three areas. The Negro couples used condoms for about 25 per cent of their exposure with

contraceptives, but coitus interruptus for only 11 per cent. For about half of the time during which they made any attempt to use contraception the Negro women relied on the douche, a contraceptive which was used very little by the New York women.

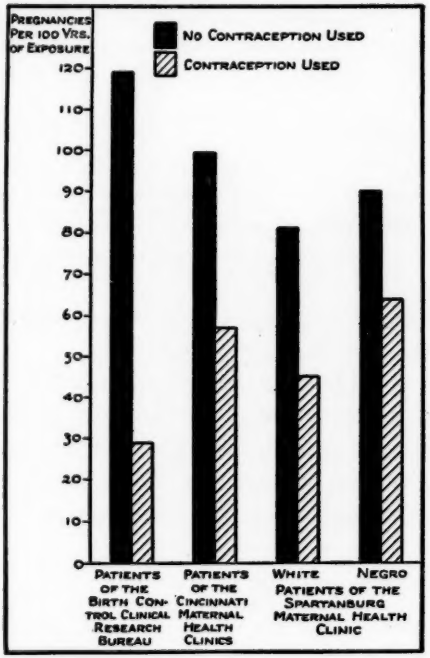


Fig. 5. Pregnancy rates with and without contraception for four groups of women prior to clinic attendance. (Rates standardized for period of married life.)

The New York couples used all contraception with much greater effectiveness than any of the other groups. The effectiveness of condom was high in Cincinnati and New York. In Spartanburg, however, its use prevented only 50 per cent of the pregnancies of the white women that would have occurred had no contraception been used for an equivalent period of exposure to the risk of pregnancy. Most of the Spartanburg couples who used condoms found them too expensive to use regularly, so that the periods of reported condom use include, in many cases, only sporadic use of the contraceptive. The effectiveness of both coitus interruptus and douche was fairly high among the New York couples, but quite low in both Cincinnati and Spartanburg. The effectiveness of both these methods depends, much more than in the use of condom, on the skill and diligence with which they are employed. Apparently the New York

Type of Contraception	White Patients of			Negro Patients of Spartanburg Maternal Health Clinic
	Clinical Research Bureau (N.Y.C.)	Cincinnati Maternal Health Clinics	Spartanburg Maternal Health Clinic	
	Total number of years of exposure with contraception			
	5,743.5	6,498.4	1,215.8	311.8
	Per cent of exposure with each type			
Total	100.0	100.0	100.0	100.0
Condom	31.4	23.9	32.3	25.1
Coitus Interruptus	36.4	35.8	29.0	11.3
Douche	5.4	23.0	17.1	49.7
All Other Contraception[1]	26.8	17.3	21.6	13.9

[1] Includes safe period, suppository, pessary, sponge, etc. as well as all alternations of two or more contraceptives.

Table 3. Proportion of each type of contraceptive practice in the preclinic exposure with contraception of four groups of women.

couples were more careful than the couples in the other cities in the use of these two methods.

In addition to the differences in the prevalence and effectiveness of contraception in the preclinic experience of the four groups of women under consideration, differences in the proportion of pregnancies terminating in live births effected a marked disparity in their birth rates (see solid bars in Figure 1). Figure 6 shows,

Table 4. Ratio of effectiveness[1] of each type of contraception used before clinic attendance, for four groups of women.

Type of Contraception	White Patients of			Negro Patients of Spartanburg Maternal Health Clinic
	Clinical Research Bureau (N.Y.C.)	Cincinnati Maternal Health Clinics	Spartanburg Maternal Health Clinic	
Total	79	52	47	28
Condom	86	81	50	43
Coitus Interruptus	78	45	53	—[2]
Douche	61	25	23	15

[1] Ratio of pregnancies prevented to those expected had no contraception been used for exposures of equal length and distribution.
[2] Insufficient exposure.

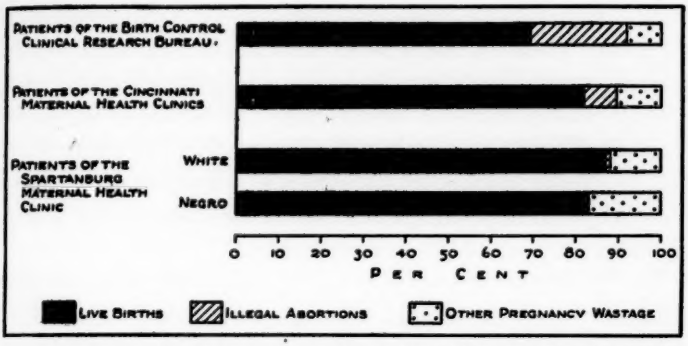

PATIENTS OF THE BIRTH CONTROL CLINICAL RESEARCH BUREAU
PATIENTS OF THE CINCINNATI MATERNAL HEALTH CLINICS
PATIENTS OF THE SPARTANBURG MATERNAL HEALTH CLINIC
WHITE
NEGRO
0 10 20 30 40 50 60 70 80 90 100
PER CENT
LIVE BIRTHS
ILLEGAL ABORTIONS
OTHER PREGNANCY WASTAGE

Fig. 6. Proportions of pregnancies terminating in live births, illegal abortions, and other pregnancy wastage for four groups of women prior to clinic attendance.

for each group of women, the proportion of pregnancies terminating in live births, illegal abortions, and other pregnancy wastage, a category which includes stillbirths, spontaneous abortions, and therapeutic abortions. Only 69 per cent of all the pregnancies of the New York women terminated in live births, while 23 per cent were terminated by illegal abortion. In Cincinnati 82 per cent of all pregnancies terminated in live births and only 8 per cent in illegal abortions. Eighty-seven per cent of the pregnancies of the Spartanburg white women terminated in live births and less than 1 per cent in illegal abortions. Only 83 per cent of the Negro pregnancies terminated in live births, but there were only four illegal abortions for all the Negro women. The high rate of stillbirth and spontaneous abortion (other pregnancy wastage) among the Negro women was associated with a high prevalence of syphilis in the group.[13] In all the white groups the proportion of pregnancies terminating in stillbirths and spontaneous abortions was between 8 and 12 per cent. Among the Negro women it was 16 per cent.

Conclusion

The effectiveness of the preclinic contraceptive efforts of the New

[13] Thirty-one per cent of the Negro women had positive Wassermann and/or Kahn reactions.

York women, as well as the large number of induced abortions in the group, leads inevitably to the conclusion that these women showed an exceptional interest in controlling their fertility. Their uncontrolled fertility was higher than that of any other groups studied.[33] It is probable that their awareness of the ease with which they conceived stimulated their efforts at fertility control, and led eventually to their seeking expert advice on contraception at some cost to themselves in both time and money.[34]

The Cincinnati patients had higher pregnancy and birth rates than the New York women, although their uncontrolled fertility was much lower. They used contraception both less extensively and less effectively and the proportion of their pregnancies terminated by illegal abortion was only one-third that of the New York women. They were mainly women from low-income families and families on relief who were referred for contraceptive advice because social workers or physicians felt that they needed to limit the size of their families and to space their pregnancies.

The birth rates per 100 women for the Spartanburg white women were somewhat higher than those for the Cincinnati patients, but their pregnancy rates per year of married life were slightly lower. The proportion of their exposure to pregnancy during which contraception was used was only about half that of the Cincinnati women, and they used contraception less effectively than the Cincinnati group. Their rates both with and without contraceptives were lower than those of the Cincinnati women, however, because their uncontrolled fertility was low.

The Negro women in Spartanburg used very little contraception before they attended the Maternal Health Clinic, and the contraception used was not very effective. They had both high birth rates per 100 women and high rates of conception per year of married life.

[33] *See* Table 1; *also* Pearl, Appendix I, Table XVI; and Beebe, Gilbert W. and Gamble, Clarence J.: Clinical Contraceptive Results in a Small Series of Patients. *Journal of the American Medical Association*, October 26, 1940, CXV, pp. 1451-1454, Table 1.

[34] *See* Stix and Notestein, pp. 10-11.

Their uncontrolled fertility was higher than that of the white women in the area, but it was not so high as that of either of the other clinic groups because nearly half of their exposure without contraceptives was that of women with pelvic infection or syphilis.

This analysis of the factors associated with the differences in the preclinic fertility of four groups of birth control clinic patients is of more than academic interest. It shows the results of differences in the attitudes of the women concerned toward the problem of controlling their own fertility. Such attitudes should determine to a great extent the policies of the clinics from which they seek advice.

The New York women who came to the Clinical Research Bureau were thoroughly familiar with a number of contraceptive techniques. Commercial contraceptives were readily available to them and, as a group, they had used them with a considerable degree of effectiveness. It was quite unnecessary to educate them to the use of contraception. They sought and obtained advice on techniques which would presumably be more acceptable to them than the contraceptives they had used previously.

Commercial contraceptives were less accessible to the women who attended the Cincinnati Maternal Health Clinics than to the New York clinic patients because most of them were too poor to buy reliable contraceptives. In addition, many of them lived in crowded homes under conditions which made the regular use of any contraceptive extremely difficult.[15] In addition to furnishing them with effective contraceptive techniques, the Cincinnati clinics had the responsibility for educating many of them to the regular use of contraception in spite of the handicaps of crowded homes and the lack of private sanitary facilities.

These problems were intensified in Spartanburg and the Spartanburg clinic had an even greater educational responsibility. Few of the patients had ever used effective contraception. In half the Negro cases and 42 per cent of the white cases there was serious illness,

[15] Stix, 1939, pp. 399-400.

which made further pregnancy dangerous to the health of the mother. The housing conditions of the Spartanburg patients were far worse than those in Cincinnati. For example, of 174 white families of six or seven people, 35 per cent lived in three rooms or less and 68 per cent in four rooms or less. Of 137 Negro families of the same size, 53 per cent lived in three rooms or less and 88 per cent in four rooms or less. Fifty-six per cent of all the white families and 66 per cent of all the Negro families had no running water and only 20 per cent of the white and 6 per cent of the Negro families had bathrooms. Thirteen white and twenty-two Negro families had not even a privy. The Spartanburg clinic had the problem of providing these women with contraceptives they would find easy to use and of teaching them the importance of consistent and regular use of the contraceptives given them.

The manner in which these varying problems were met by the three clinics will be the subject of discussion of a subsequent report.

DIFFERENTIAL FERTILITY BY COLOR FOR COAL MINERS IN LOGAN COUNTY, WEST VIRGINIA[1]

GILBERT W. BEEBE

ALTHOUGH differential fertility by color is widely recognized in the United States, the basis of the frequently lower fertility of Negroes has proved difficult to probe. Innate fecundity, acquired pathology, and contraceptive practice do not readily lend themselves to study, and representative sampling is not always feasible. While many students of the problem have stressed environmental as against innate factors, Pearl and Notestein have furnished perhaps the best evidence against the existence of important innate differences favoring whites. Restricting his comparison to noncontraceptors married once only, and without gynecological disease, Pearl[2] has shown for his selected group the absence of any reliable color difference in the chance of conception. Even this finding does not exclude the possibility of variation in the incidence of inherited sterility, for women gained access to the series only through admission to a hospital for obstetrical care. Notestein's important study[3] of the 1930 population of the East North Central states shows a reversal of the usual color differences favoring whites within each residence group when comparison was restricted to mothers. In this study the factor of contraception could not be taken into account, but data such as those of Pearl have been accepted as evidence that the contraceptive practice of Negroes is neither so extensive nor so effective as that of whites.

In the light of the probable color incidence of venereal infection and its implications for reproduction, these findings have suggested

[1] From the Milbank Memorial Fund and the National Committee on Maternal Health.

[2] Pearl, R.: Third Progress Report on a Study of Family Limitation. The Milbank Memorial Fund *Quarterly*, July, 1936, xiv, No. 3, pp. 258-284.

[3] Notestein, F. W.: Differential Fertility in the East North Central States. The Milbank Memorial Fund *Quarterly*, April, 1938, xvi, No. 2, pp. 173-191.

acquired sterility and pregnancy wastage as the source of the differential. They do not, however, entirely dispose of either innate differences or contraceptive practice. It is the purpose of this note to demonstrate the irrelevance of contraception in producing the very marked color difference observed for a fairly representative sample of bituminous coal miners in Logan County, West Virginia.

The sampling was conducted in 1939 in order to ascertain the proportion of rural-nonfarm women in the County who would accept a contraceptive service. The available time and funds prohibited a sampling procedure in accordance with the principle that each member of the universe be granted an equal chance of selection. However, it was thought practicable, if not entirely wise, to shift the sampling unit to residential areas, mainly coal camps in this instance. From a list of areas were excluded a few for the reason that the local physician did not favor the contraceptive project, and certain other very isolated areas difficult of access. It may be said of the final list that it was probably somewhat biased in the direction of accessibility. From the resulting list, amplified to 149 areas by the subdivision of large coal camps, fifteen were selected at random.

The survey of the fifteen areas was highly successful from the standpoint of completeness of enumeration and response of subjects. In all, 539 married women of reproductive age were interviewed, 30 per cent Negroes and 70 per cent whites. Each woman was offered contraceptive aid. Those who accepted furnished a full reproductive history. The women who rejected gave a brief one containing:

Color
Age at last birthday
Age at first marriage
Number of children ever born alive
Occupation of the husband
Employment status of the husband
Whether or not contraception had ever been employed
Reason for refusal of contraceptive aid

With the exclusion of four incomplete histories the sample consists

of 535 women and may be studied only with respect to the above factors.

The fertility difference is shown in Table 1 by age, the measure being births per 100 woman-years of married life for women under 45 living with their husbands when visited. This measure, of course, is not ideal, but is sufficiently precise for the present purpose. The rates are not age-specific, but represent the accumulated experience of women of specified age at interview. For each age group beyond the second the rates are significantly higher for whites than for Negroes, and the comparable total rates show the average fertility of the whites to be more than 50 per cent higher than that of the Negroes. If contraception played a role in this result, Negroes practiced contraception either more effectively or more of the time.

The untenability of either hypothesis, however, is clear from Table 2. Only 7 per cent of the Negroes reported contraceptive practice, in comparison with 33 per cent of the whites. The equivalent percentages of years of marriage are almost identical, being 6 and 34. Moreover, the rate for Negro contraceptors is actually higher than that for white contraceptors, although based upon an unreliably small number of women. The noncontraceptive experience presents the same pattern as Table 1. The experience of the whites is also striking in demonstrating the selection of contraceptors from

Table 1. Differential fertility by color and age, for married women under 45.

Age	Negroes				Whites			
	Women	Years of Marriage	Live Births	Rate[1]	Women	Years of Marriage	Live Births	Rate[1]
15–19	11	21	9	*	49	91	46	*
20–24	36	173	65	*38*	99	418	180	*43*
25–29	31	255	58	*23*	76	702	254	*36*
30–34	28	402	83	*21*	64	863	272	*32*
35–39	33	619	86	*14*	53	1,003	254	*25*
40–44	16	385	51	*13*	39	913	216	*24*
Total	155	1,865	352	*19*	380	3,990	1,222	*31*

[1] Live births per 100 woman-years of marriage.
* Less than 100 woman-years of marriage upon which to base a rate.

Color	Women	Years of Marriage	Live Births	Rate[1]
	A—CONTRACEPTORS			
Negro	11	107	57	*53*
White	127	1,364	486	*36*
	B—NONCONTRACEPTORS			
Negro	144	1,758	295	*17*
White	253	2,626	736	*28*

[1] Live births per 100 woman-years of marriage.

Table 2. Differential fertility by color and prior contraceptive practice, for married women under 45.

among the most fertile women, for the selection is evident at each age-interval and as a pattern is highly significant in the statistical sense.

The marked selective influence of the offer of contraceptive aid is demonstrated in Table 3 which contrasts women who accepted and women who rejected, preserving the division of prior contra-

Table 3. Fertility comparison according to acceptance or rejection of contraceptive aid, by color and prior contraceptive practice for married women under 45.

Color	Accepted				Rejected			
	Women	Years of Marriage	Live Births	Rate[1]	Women	Years of Marriage	Live Births	Rate[1]
	A—CONTRACEPTORS							
Negro	9	92	47	*	2	15	10	*
White	56	526	226	*43*	71	838	260	*31*
	B—NONCONTRACEPTORS							
Negro	27	185	80	*43*	117	1,573	215	*14*
White	74	608	291	*48*	179	2,018	445	*22*
	C—ALL WOMEN							
Negro	36	277	127	*46*	119	1,588	225	*14*
White	130	1,134	517	*46*	250	2,856	705	*25*

[1] Live births per 100 woman-years of marriage.
* Less than 100 woman-years of marriage.

Reason	Negro				White			
	Women	Years of Marriage	Live Births	Rate[1]	Women	Years of Marriage	Live Births	Rate[1]
Pregnancy Desired	24	147	9	*6*	20	81	8	*
"No Need"	68	1,192	118	*10*	45	743	103	*14*
Other	25	234	88	*38*	114	1,194	334	*28*
Total	117	1,573	215	*14*	179	2,018	445	*22*

[1] Live births per 100 woman-years of marriage.
* Less than 100 years upon which to base a rate.

Table 4. Fertility of noncontraceptors refusing aid, by reason for refusal and color, for married women under 45.

ceptive practice. In each instance the group accepting the service had the higher fertility. This is apparently a large factor in the lower service acceptance of the Negroes.

The validity of this difference is strengthened by the distribution of reasons for rejection by color and prior contraceptive practice. The Negroes are heavily overweighted with women desiring pregnancy and with women manifesting "no need." They are underweighted with women giving as reasons for refusal apathy, religious or other prejudice, sterilization, and pregnancy or abstinence. The inference seems justified that the Negroes as a group have an involuntary basis for their lower fertility. The point is brought home forcibly in Table 4 which gives relative fertility according to reason for refusal. It is evident that reasons suggesting low fertility are in fact accompanied by substandard reproduction and go far to explain the general differential observed.

For the State of West Virginia the National Resources Committee[4] report gives average annual age-specific live birth rates for married women for the years 1918-1921 and 1929-1931. These fertility schedules, showing large color differentials for these years, may be applied to the present body of data for the computation of expected rates comparable with those observed for the sample. This has been

[4] National Resources Committee: Population Statistics. 2. State Data. Washington, Government Printing Office, 1937.

done in Table 5 which shows fair agreement between observed and expected in this sense. For the Census year 1930 the crude birth rate for Negroes in Logan County approximated the State rates for rural and for all Negroes. The crude rates of Logan County whites, on the other hand, have consistently exceeded those of the white rural population of the State. While the observed rate of 31 is significantly above that of 26 for 1929-1931, it matches the corresponding rate for 1918-1921 and is perhaps lower than the crude differentials would lead one to expect. However, it is difficult to assign a specific point in time to the observed rates since they represent the accumulated experience of women of varying duration of marriage. Should the suggestion be correct that the whites in the sample are slightly below the whites of Logan County in average fertility, it would follow that the color differential observed within the sample may slightly understate the case. Since the argument here is concerned not with the estimation of the size of the differential but with the explanation of its existence, the comparison supports the extension of the argument from the sample to the universe, especially in view of the consistent color differentials in the age-specific rates published by the National Resources Committee for the State.

Table 5. Comparison of observed fertility with that expected from West Virginia state schedules for 1918-1921, and 1929-1931, by color, for married women under 45.

Rate[1]	Negro	White
Observed	19	31
Expected[2]		
1918–1921	21	31
1929–1931	19	26

[1] Live births per 100 woman-years of marriage.
[2] Computed by applying West Virginia annual average age-specific live birth rates to the duration of marriage distribution within each age-at-interview group.

Notestein[5] has shown the color differential for the 1930 population of the East North Central states to be attributable to a high incidence of childlessness among Negroes. This valuable contribution has been followed up with the present data. Among the Negro non-

[5] *Op. cit.*

contraceptors the percentage reporting no live births is 31 and significantly above the percentage of 18 for the whites. Rates based upon fertile women reduce the differential between 17 and 28 (*see* Table 2) to one between 22 and 31, the latter also being well outside the chance range. In other words, while the Negroes do exhibit markedly higher childlessness, this fact alone by no means accounts for their lower fertility in the present sample.

The observations reported here provide additional evidence in favor of an involuntary basis for the established color differential in fertility. The data show that contraception cannot be assumed to play a part, but furnish no ground for choosing between the two remaining and compatible alternatives, viz:

1. that absolute and involuntary sterility is more prevalent among Negroes; and
2. that pregnancy wastage, either voluntary or involuntary, is reliably higher for Negroes.

With reference to the latter it may be said of the women who accepted the service that the pregnancy wastage of Negroes was not appreciably different from that of whites and that in neither group was voluntary pregnancy wastage of real consequence.

ANNOTATIONS

MEDICAL BIOMETRY AND STATISTICS

Among textbooks on statistical methodology, the Introduction to Medical Biometry and Statistics, by Raymond Pearl has had a distinctive position since it was first presented in 1923. The publication of a third edition,[1] which is revised and much enlarged, will be welcomed by those familiar with the former editions, and this text should win many new users. This new edition retains the characteristics of earlier editions. It combines in one volume the methods and matter commonly designated as vital statistics or demography and the methodology of analysis based on the theory of probability, measurement of variation, and of correlation. As in previous editions, Dr. Pearl has emphasized the fact that this is an introductory textbook written especially for medical students, and for medical and public health readers and research workers. The data and examples of application of methods used throughout are selected for their value and interest to these groups. Illustrative data have been increased and brought up to date, and the addition of many references has brought the reading lists up to date. In spite of the many statistical textbooks, new and revised, which have been published in the past few years, *Medical Biometry and Statistics* should continue to hold its uniquely useful place for persons in the fields of medicine and public health.

Nearly half of this book is devoted to a discussion of the "raw data of biostatistics" and methods for their collection, tabulation, and presentation. Record forms, problems of sampling in the collection of data, and graphic methods are adequately and fully treated. The chapter on rates and ratios interprets and describes the computations for the various quantitative expressions used for the data of vital statistics, and includes definitions for prevalence and incidence rates which are so commonly misused. This chapter and that on adjusted death rates is recommended to

[1] Pearl, Raymond: Introduction to Medical Biometry and Statistics. Philadelphia and London, W. B. Saunders Company, 1940.

every reader and user of mortality and morbidity data. The chapter on life tables has been enlarged and its value enhanced by the inclusion of detailed instructions for the construction of abridged life tables by the method developed by Reed and Merrell.

The latter half of the book deals with the theory of probability, the measurement of variation, correlation, and simple curve fitting. In a new chapter on the measurement of variation, Dr. Pearl has included several topics not usual to textbooks on statistical methods; for example, the use of deciles as class limits for frequency distributions, and a description of coefficients of racial likeness and group divergence. On the other hand, methods are omitted which are now widely used by statisticians. It seems unfortunate that space was not made for at least a brief reference to the t-test which is being used more and more frequently in dealing with small samples, since readers of statistical studies will inevitably meet this expression. The choice of material to be included in an elementary text is difficult, and the detailed exposition of topics included has produced a large book of exceptional usefulness, not only for beginners but also for research workers who have not specialized in the mathematical bases of statistical methods.

DOROTHY G. WIEHL

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TUBERCULOSIS AMONG MASSACHUSETTS SCHOOL CHILDREN

IN the first of a series of articles of which the purpose is to discuss certain epidemiological characteristics of tuberculous infection and disease, as revealed by the data from the school clinics of the Massachusetts Ten-Year Program, Dr. E. P. Hutchinson and Dr. Alton S. Pope[1] have outlined the procedure in the clinics and analyzed the incidence of infection, as shown by reactions to the von Pirquet tuberculin test, in the school population of twelve Massachusetts cities and a large group of smaller communities.

The survey period, 1924-1934, was divided into three parts with a different procedure in each. The study of incidence of infection is restricted

[1] Hutchinson, E. P. and Pope, Alton S.: Tuberculosis among Massachusetts School Children. A Report on the Massachusetts Ten-Year Program. Part I. The Incidence of Infection. *The American Journal of Hygiene*, March, 1940, 31, No. 2.

to the last two periods, since the children examined during the first period, 1924-1927, included only those in three groups considered particularly liable to tuberculosis and were not representative of the school population. In the second and third periods, 1927-1929 and 1929-1934, all children, subject to parental consent, were included in the examinations. They were given a von Pirquet tuberculin test and the positive reactors were x-rayed. In addition, in the second period, each child was given a physical examination, but during the last period, in order to include a larger number, no physical examinations were made of non-reactors and children with normal films.

Reasons for using the von Pirquet test in such a survey are discussed. Its advantages were that it was more acceptable to the public than a test which required the use of a "needle," and that only a single test was required. Since the object of the test was not the exclusion of the presence of tuberculosis, but the mass screening of school children, and since parental consent was essential, it was felt that the acceptability of the test was important, that a larger number of reactors would be found by using a less accurate test on a large number of children than by using a more accurate test on a smaller group. Results of studies comparing the accuracy of the von Pirquet and intracutaneous tests are quoted to show that the von Pirquet test, although less accurate, may be considered adequate for certain purposes.

In considering the results of the survey the authors point out that tuberculosis mortality rates by age and sex, upon which most of our knowledge of the relative frequency of tuberculosis has been based, are not reliable indices of the distribution of either infection or active disease, since "the mortality rate can be looked upon as the product of at least three components: the infection rate in the total population, the morbidity rate of the infected, and the case fatality rate." Because of the difficulty of estimating susceptibility from mortality data, the present series of articles was designed to show the distribution of infection and disease among Massachusetts school children for comparison with mortality rates over the school range of years.

In the total group of 117,000 children tested in eighty-nine Massachusetts cities and towns, the reaction rates of males and females were found to be practically identical. In the individual towns the correspondence was less close, but the variations occurred as often in one direction as another. When the reaction rates of the two sexes in a random series of

towns were adjusted to a standard age distribution, the rates remained approximately equal. The paired rates of males and females computed by single years of age in each of the twelve largest cities showed a marked tendency to equality, clearly indicated by a graph in which the male reaction rate was measured on one coordinate and the female reaction rate on the other. The points clustered around the diagonal representing equality between the paired rates.

As might be expected, the relative positions of the rates of the two sexes were not affected by removal of contact cases before computing reaction rates. This correction reduced the rates of both males and females about equally.

The reaction rates by age and sex plotted for twelve cities and four groups of smaller towns all showed an upward trend with age and a generally close agreement between the curves for males and females. However, local differences in the frequency of reaction and in the shape of the age curve were observed in the Massachusetts survey, which could not be explained as results of variation in method. Although it is stated that "in a general way, local differences in reaction level and in the steepness of the upward trend with age presumably reflect different degrees of prevalence of opportunity for infection, different rates from year to year at which the diminishing number of non-reactors acquire sensitization," the statment is also made that no consistent relationship between the percentages of reactors and the case rates in the various cities could be demonstrated. The authors emphasize also that reaction rates are not an indication of relative susceptibility.

It will be of interest to relate the findings described in this article to the later articles of the series which "will deal with the incidence of clinical disease, and with contact cases as a separate group."

MARY E. DALTON

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NET REPRODUCTION RATES, 1930-1940

RECENT preliminary releases from the Bureau of the Census afford some interesting estimates of net reproduction rates for 1940, with comparable figures for 1930.[1] The net reproduction rate affords a measure of

[1] The Net Reproduction Rate—The Measure of Future Population Growth in the

(Continued on page 200)

the potential increase or decrease of a population under conditions of the age-specific birth rates and death rates prevailing at the time under consideration. Thus, if—as in the data from the Census release—the rate is expressed in terms of the average number of daughters that would ever be born per 100 female infants starting life together, a rate of 100 would signify a potentially stationary population; a rate of 75, a potentially declining population at the rate of 25 per cent per generation; and a rate of 125, a potentially increasing population at the rate of 25 per cent per generation. It should be emphasized that the net reproduction rates are based on the assumption that as the cohort of 100 newly born females pass through life they will be affected by the age-specific fertilities and mortalities prevailing at the time under consideration. In considering the meaning of net reproduction rates in terms of potential increase or decrease of the population, it should also be borne in mind that these rates assume no population changes resulting from migration. They are designed simply to afford a measure of the permanent self-replacement potentialities of a population under existing birth and death rates at specific ages.

The rates for 1940 and 1930 are presented on page 201 for the total population and for subdivisions by color and residence.[2] The 1940 data are estimates based upon a 5 per cent random sample of the 1940 census returns, so the final figures may be somewhat different.

Several points of interest stand out. Regarding the figures for 1940, it will be noted that the estimated net rate of reproduction for the total country was 96, or 4 per cent below the level required for permanent replacement of population under existing age schedules of fertility and mortality. Of most striking interest, however, is the contrast between the urban and rural rates. The estimated net reproduction rate for the total urban population in 1940 was 76, meaning that with continuation of existing age-specific fertility and mortality rates the urban population

United States (Preliminary): 1940. United States Department of Commerce, Bureau of the Census, Series P-5, No. 2. Released for use of morning papers on January 31, 1941.

Future Population Growth in the United States by Color and Urban-Rural Residence as Measured by the Net Reproduction Rate (Preliminary): 1940. United States Department of Commerce, Bureau of the Census, Series P-5, No. 4; February 21, 1941.

[2] As explained in the preliminary release of February 21, 1941 (Series P-5, No. 4), the net reproduction rates "were computed by the so-called 'indirect method' from the age structure of the population in 1940 and in 1930. The number of births was estimated from the number of children under 5 years of age. Since these children were the survivors of births in 1935-1939 and 1925-1929, respectively, the reproduction rates do not strictly apply to the census dates."

would ultimately decline at the rate of 24 per cent per generation, if there were no increments from migration. On the other hand, the fertility and mortality conditions in the total rural-nonfarm population were such that this group would ultimately increase at the rate of 16 per cent per generation and the total rural-farm population at the rate of 36 per cent per generation, if the estimated conditions of 1940 continued, and if there were no exodus to cities. Stated in another manner, the urban net reproduction rate was about 34 per cent lower than that for rural-nonfarm population and 44 per cent lower than that for the rural-farm population.

In the classification by color, the estimated net reproduction rates for 1940 for the total white population (including Mexicans) was 95, whereas that for the nonwhites was 107. The higher rate for the nonwhites accrued entirely from the difference by color in the rural-farm population, where the rates were 132 for whites and 154 for nonwhites. Within the urban and rural-nonfarm populations the rates by color were virtually the same.

According to these preliminary figures, the net reproduction rate for the total population was 13.5 per cent lower in 1940 than in 1930. This apparent decline did not differ much by type of residence, being 13.6 for urban, 12.1 for rural-nonfarm, and 14.5 for rural-farm. It will be noted, however, that the apparent decline of net reproduction rates from 1930 to 1940 was due mainly to whites. For the total whites, the estimated rate in 1940 was 14.4 per cent lower than the rate for 1930, whereas for the total nonwhites it was only 2.7 per cent lower. Differences of essentially

Net reproduction rates by color and urban, rural-nonfarm, and rural-farm residence, United States, 1940 and 1930.[a]

(1940 data are estimates based on a 5 per cent cross-section of the 1940 census returns. Figures for white population in 1930 have been revised to include Mexicans.)

Color and Census Year	Total	Urban	Rural-Nonfarm	Rural-Farm
All Classes				
1940	96	76	116	136
1930	111	88	132	159
White				
1940	95	76	116	132
1930	111	90	133	159
Nonwhite				
1940	107	76	115	154
1930	110	75	119	156

[a] Taken from preliminary release from the Bureau of the Census, Series P-5, No. 4, February 21, 1941.

this character held true within urban, rural-nonfarm, and rural-farm populations considered separately.

The broad significance of the urban-rural differentials in net reproduction rates has been emphasized by many students. In a real sense, rural areas are our population nurseries because cities must depend upon them for population renewals. The main problem in this situation is that the most prolific populations are those in poor rural communities where facilities for health and education are least adequate. This problem transcends local concern because many of the surplus youth in such areas eventually migrate to cities in search of a more satisfactory life and livelihood.

CLYDE V. KISER